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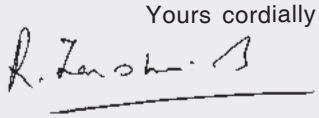

Madurai
20. 06. 2019

Dr. R. LAKSHMIPATHY
PUBLISHER

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Polycystic Ovary Syndrome (PCOS)

Polycystic Ovary Syndrome (PCOS) is characterized by anovulatory cycle, polycystic ovaries and hyperandrogenism besides insulin resistance. It is associated with hirsutism, obesity, increased risk of diabetes and metabolic syndrome.

PCOS is common in young women. It presents with disturbed cycles – amenorrhoea to menorrhagia and subfertility. Sedantary lifestyle, increase in body weight, obesity and fast food habits are all predisposing factors.

Weight reduction and exercise are often effective in reversing the metabolic effects and inducing ovulation. Metformin is beneficial for the metabolic effects of PCOS. Clomiphene is useful in ovarian stimulation. If ovulation induction fails, low dose gonadotropin treatment can be tried. Second line therapies such as aromatase inhibitors or laparoscopic ovarian drilling are sometimes tried. Women with PCOs are at a greater risk for twin gestation with ovarian stimulation

Medroxy progesterone acetate, for 10 days every month (10mg/day) for 1-3 months can be useful in avoiding endometrial hyperplasia. Combined contraceptives can be used to regularize the cycles, in addition to controlling hirsutism. Spironolactone, flutamide are sometimes effective in hirsutism, when used along with contraceptives.

The key to treatment of PCOS remains control of weight, diet and exercise, with regulars monitoring of lipid levels.

❖

(N. HARIHARASUBRAMANIAN MD, PHD)

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Nutraceuticals — a preventive approach

SANJAY AGRAWAL

Introduction

Nutraceuticals may be considered as food, food supplement or drug like agent which may apply for health promotion, disease prevention and adjunctive supplement with the treatment with drugs. Nutraceuticals, a super food today is expected to play an important role in preventative healthcare. The ageing population is giving rise to lifestyle-related diseases, like obesity which can impact the quality of life and physical health of the individuals. This can be decreased by making healthier choices and that should be earlier in life. This again brings us to focus on measures, such as a healthy diet, earlier in life to prevent people from getting ill in the future. Healthcare research, has always emphasized on the concept of PREVENTION IS BETTER THAN CURE Nutraceuticals even today are being advised as a curative measure but rather they are believed to be more beneficial as preventive food source than a curative source of food. Nutraceuticals are just new 'superfoods', to consider one example, which persuade people to make better choices about their diet which is playing an important role today in everyone's life. Therefore always there is a need to remind and incentivize people to make better dietary choices and promote exercise. These pill-replacing foods could invigorate demand for further new nutraceutical products designed to promote wellness. The main purpose of this article is to provide summary of the current scientific impression of nutraceuticals in comparison with today's medicinal world to the practitioner's.

Exploration of the new dietary products with various medicinal properties has created a renaissance in the world of health and nutritional research. These are the emerging natural foods popularly known as super foods are making the line between foods and drugs. It not only provides physiological health benefits but also different medicinal implications.

Nutraceuticals are to be taken normally as a part of our daily diet to accomplish lucrative effect. Nutraceuticals have created a new era of research to promote the quality of life of people. They can reduce the risk of disease or onset of disease by retaining and restoring normal health condition and by improving immunity. The treatment approaches followed today in modern medicine for treatment of disease are seeking complementary or alternative beneficial products to the drugs which the people today are expecting. These products, the nutraceuticals have fulfilled this gap.

Nutraceuticals play an important role based on their health promoting and diseases modifying indications. There are a variety of herbal nutraceuticals that have been efficient to cure stress due to free radicals, including allergies, Alzheimer's disease, cardiovascular diseases, diabetes, and cancer, inflammatory as well as obesity.

The main aim of this nutritional therapy is based on the complimentary therapy with nutraceuticals as food is not only to serve as the source of energy and nutrients but also to provide medicinal benefits. Nutraceuticals help in detoxification of our body along with restoring the healthy digestion and also emphasizing the healthy dietary habits.

Nutraceuticals can be classified based on the source of foods, mechanism of action and their chemical properties. The food sources used as nutraceuticals are all natural and they are dietary fiber, probiotics, prebiotics, PUFA, antioxidant vitamins, polyphenols and so on.

Nutraceuticals have various bioactivities towards human body are widely being examined for their ability to provide health benefits. Nutraceutical plays an important role in preventing different disease conditions, their onset and minimize complications of the disease. It provides protection against various non communicable diseases, helps to delay ageing process, increases the life expectancy and improves function and immunity of the body.

Role of different nutraceuticals as a preventive part in different disease conditions.

- Onion, Garlic, Grapes, Rosemary, Broccoli, Spinach, Turmeric, Parsley having Antioxidant activity
- Mitochondria Targeted Nutraceuticals Mitochondrial bioenergetics Flavonoids, Polyphenols, Probiotics for Gastro intestinal health

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- Nutraceuticals like Magnesium Citrate, Pine Bark of Pycnogenol, Pygeum, Potassium Citrate, IP6, Lutein, Lycopene, Xeaxanthin for Renal and excretory health
- Ubiquinone Q10, Vitamin B6, Vitamin B12, Pycnogenol, Flax seed oil, Fish oil for Reproductive health
- Blueberry, Green Tea, Catechins, Carnosine, Vit D3, PUFA, Essential Amino Acids for Stem cell growth
- Nutraceuticals present in citrus fruits, Soyabean, Spermidine, Caffeic Acid and Rosmarinic Acid for Prolonging life Span
- Flavonoids, Flavones, Flavonones, Quercetin in Onion, Cruciferous Vegetables, Black Berries, Cherries, Berries, Apples and Allicin for Cardio vascular diseases
- Ginseng, Beta Carotene, Sulfur Compounds in Garlic. Cancer 24-27Soy Isoflavones, Omega 3 Fatty Acid, Lipoic Acid, Catechins, Spices Like Fenugreek and Cinnamon, Bitter Melon, Pomegranate for Diabetes mellitus
- Conjugated Linoleic Acid, Capsaicin, Psyllum, Herbal Nutraceuticals like Chitosan, Caffeine, Fenugreek, Vitamin C, Green Tea, Curcumin, Black Gram,Bottle Guard for Obesity
- Diacerin, Banana, Ginger, Green Tea, Pomegranate, Boswellia, Oxaceprol, Tipi, Willow Bark, Curcumin, Avocado, Soybean, Collagen Hydrolysate, Chondroitin Sulfate and Glucosamine for Osteoarthritis
- Odonto Nutraceuticals, Green Tea, Grapes, Cocoa Seed Extracts rich in Polyphenols, Flavonoids and Proanthocyanidins for Oral diseases
- Curcumin, Lutein, Lycopene, Lavandula, Beta Carotene, Folic Acid and VitB12 for Alzheimer's disease
- Plant Polyphenols, Stilbenes, Soybean & Other Phytoestrogens, Vitamin C, Vitamin D, Vitamin E, Coenzyme Q 10, Unsaturated Fatty Acid, Brahmi and Inosine for Parkinson's disease.
- Lutein, DHA, Green Tea, Carotenoids, Flavonoids, Vitamin E, Coenzyme Q10,Zeaxanthi,Melatonin, Spirullina, Flavonoids, Ascorbic Acid, Tocopherol, Carotenoids, Caffeine, Pyruvate for Eye disorders
- Adaptogens (Ashwagandha, Rhodiola, L-Theanine, Ginseng) for Stress Management

The scope of nutraceutical field is huge both in terms of type and the varieties of the nutraceutical product. Nutraceutical industry now in India is one of the rapidly growing markets. Both higher and upper middle class people are perceiving nutraceuticals as important alternatives to prescribed drugs and exclusively for their beneficial properties without any side effects. Consumers are now showing sharp interest in nutraceuticals for boosting energy and also for improving their physical endurance and also mental alertness. Nutraceutical industries are also focusing to develop new products with innovative formulations for choosing the right products to the consumers and improve the quality of life.

Nutraceuticals therefore have significant role in the promotion of human health and prevention of disease of all age groups. They are widely accepted by all age groups mainly due to their safety, higher quality, purity, efficacy, health promoting and disease curing abilities and activities. This is going to be the newest trend towards nutraceuticals leading to new era of medicine and health. It is still in the stage of infancy in India. In this era of medicines we must say "let the food be your medicine of choice" and "nutraceuticals daily usage can keep the medicine away".

Nutraceuticals have always received considerable zest for their safety profile, high nutritive and therapeutic effects. These are being used as alternatives to modern medicines that would promote quality of health, increase the nutritive value of the diet and would prolong the life expectancy. Major constituents of the nutraceuticals are herbal extracts, different nutrients and dietary supplements. These are involved in preventing different diseases and also minimizing pathophysiology of the diseases too. It also acts on the immune system boosting the immunity, as a natural antioxidant, anticancer, anti-inflammatory, antidiabetic, cardio protective, organ protective agent and also with different health promoting effects. Ultimately, the main motto of these is they ensure better quality of life.

Therefore nutraceuticals should always be considered as a preventive approach than a curative approach which might be helpful to reduce the use of drugs and increase the quality of life of people and also to formulate further innovative research plan in new domain on nutraceuticals.

Our Clinical Biochemistry laboratory performance monitoring based on External Quality Assessment scheme (EQAS) performance indicators: AIIMS Rishikesh, Uttarakhand

KAMLESH RABARI, SARAMA SAHA, MANISHA NAITHANI, AMIT SAMADHIYA, PARMILA DUDI, BELA GOYAL, RISHAV RAJ, ANISSA ATIF MIRZA

Background: *EQAS performance give confidence to doctor and patient about reliability of laboratory results.*

Aim: *To evaluate and monitor reliability of our laboratory results in terms of EQAS performance indicators.*

Methods: *Evaluation of EQAS results in terms of performance indicators assigned by EQAS body from March 2014 to October 2018 were studied and eighteen parameters from our laboratory were chosen including plasma Glucose, Serum Urea, Creatinine, Total Bilirubin, Total Proteins, Albumin, Calcium, Phosphorus, Triglyceride, Sodium, Potassium, Chloride, AST, ALT, ALP and Glycated hemoglobin*

Results: *Our study results has shown a following performance in term of performance indicator Overall Mean Variation Index Score (OMVIS) with 41.2% 55.6%, 66.7%, 66.7% and 50% of the total results coming under very good performance score category in the years of 2015, 2016, 2017 and 2018 respectively. Study has also shown inconsistencies of a few parameters especially AST, ALT, Creatinine, Phosphorus, Glucose, Uric acid, Albumin and total protein.*

Conclusion: *EQAS is an important tool to monitor and maintain the laboratory performance. These results have helped us obtain quality test results and to also get confidence in generating a reliable report by pointing out our nonconformities.*

Key words: *QC, EQAS, OMVIS*

Introduction

Quality can be defined as conformance to the requirements of users or customers and satisfaction of their needs and expectations. "Quality is never an accident; it is always the result of high intention, sincere effort, intelligent direction and skillful execution."Knowledge base regarding Laboratory quality has evolved over more than 4 decades since the 1strecommendation for quality control was published in 1965.[1] Quality control in clinical laboratory context is designed to detect, reduce and correct deficiencies.[2,3] It helps monitoring routine performance of laboratories analytical process. Overall quality results are achieved by dual efforts of not only laboratory quality planning and its proper execution but also by focusing efforts on internal quality control (IQC) and External quality control. IQC is a continuous process to check the quality of laboratory and to detect and correct any problems that can arise. IQC is necessary for daily monitoring of precision and accuracy of analytical method whereas External quality control achieved by enrollment in External Quality Assessment scheme (EQAS) is important for maintaining long-term accuracy of analytical methods. EQAS is testing of laboratory results by an independent external agency periodically and retrospectively. External quality assessment is continuously evolving to a broad scope of activities, including not only laboratory performance evaluation, but also method

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performance evaluation, post-market vigilance, training and help.[4]

EQAS helpful in evaluating analytical performance of a laboratory compared to other participating laboratories performance by samples supplied by the external agency.[5] EQAS measures a laboratory's accuracy using 'blind' samples that are analyzed as if they were patient samples. Results are returned to the scheme organizer for statistical analysis. Laboratories receive a report comparing their individual performance against other participants in the scheme. EQAS is to supplement IQC and never a substitute for IQC. External Quality Assurance participation is usually required for accreditation. Also, EQA participation creates a network for communication, and can be a good tool for enhancing anational laboratory network. Samples received for EQA testing, as well as the information shared by the EQA provider, are useful for conducting continuing education activities. EQAS is an essential aspect of any laboratory operation. EQAS is essential part of clinical biochemistry laboratory. It is part of a quality assurance activity that supports the improvement of health care services. EQAS measures a laboratory's accuracy using 'blind' samples that are analyzed as if they were patient samples. Results are returned to the scheme organizer for statistical analysis. Laboratories receive a report comparing their individual performance against other participants in the programme. The data analysis and use of the suitable scoring index is another important phase in the process of EQAS. The scoring systems are used for the judgment of individual laboratory indicators as well as of a number of indicators for the assessment of the overall performance.6Overall coefficient of variation (CV) to indicate the precisions and variance index score (VIS) which shows bias of the performance.[6,7]

Aim of our present exercise was to monitor and evaluate our Clinical Biochemistry laboratory performance based on our External Quality Assessment scheme (EQAS) Performance indicators and assess corrective actions utilized till date and arrive at further needs.

Materials and methods

EQAS results achieved by participation of our Clinical Biochemistry Laboratory, Department of Biochemistry, All India Institute of Medical Science Hospital, Rishikesh, Uttarakhand; from March 2014 to October 2018 were included in our study. Initially analysis were being performed utilizing semi autoanalyzers with lab being initiated on March 2014 and later on expansion of services workload was shifted to from Fully automated analyzers from 2015 onwards. The lyophilized samples were received on a quarterly basis that needed to be stored, reconstituted and analyzed as per the guidelines and schedule provided by the organizing EQAS body. For each month lyophilized unknown/blind sample provided by the EQAS body (Department of biochemistry, Christian Medical College, Vellore), were reconstituted on scheduled dates and analyzed for the parameters for which our laboratory participated. The results were uploaded on the EQAS website on the scheduled dates and our performance score was downloaded after completion of each month. The tests were performed on our Beckmann Coulter automated biochemistry analyzers of Model AU-480, AU-680, AU-5800.

Eighteen parameters from our laboratory were chosen for assessing our performance in participation of EQAS programme. These included parameters with methods in as blood Glucose (Hexokinase), Urea (Urease - GLDH), Creatinine (Jaffe's kinetic), Total Bilirubin (Jendrassic and Grof), Total Proteins (Biuret), Albumin (BCG), Calcium (Arsenazo), Phosphorus (Colorimetric without precipitation), Uric acid (Uricase), Cholesterol (CHOD-PAP), Triglyceride (Enzymatic), Sodium (ISE), Potassium (ISE), Chloride (ISE), AST (Uv-Kinetic), ALT (Uv-Kinetic) and ALP (PNP AMP Kinetic) and HbA1c (immuno - turbidimetry). EQAS for HbA1c started in 2015 so this included in study thereafter. All these parameters Performance were analysed in terms of the VIS (variation index score) and SDI of each month from March 2014 to October 2018. A monthly VIS and SDI of each analyte is calculated which is used to evaluate monthly results

VIS is calculated as follows:

% Variation

% Variation(% V) = (Difference between Participant's Result and Designated value/Designated value) × 100

From % Variation,VIS can be calculated

VIS = [% Variation (% V) / CCV] ×100

Where Designated Values from ISO 15189 certified laboratories and CCV is the chosen coefficient of variation also called desired CV is derived from the performance of the participants over the last two years in this program. The desired % CVs for the various analytes areprovided by CMC, Vellore. Where, designated value for a particular test is the value

obtained after excluding results, from labs with same method which are >3SD of the method mean and recalculating the mean after eliminating the outliers.

OMVIS	Interpretation
<100	Very good
101-150	Good
151-200	Satisfactory
>200-	Not acceptable

Overall mean of VIS also called OMVIS was calculated from monthly VIS scorevalues for each parameter. OMVIS < 100 is considered as very good score and very close to designated value. OMVIS of 100-150 is considered good. OMVIS of 150-200 is just satisfactory but need to take care of those parameters for which the reported values are very different from the designated value for that particular method. OMVIS>200 is not acceptable and urgent steps to identify the causes followed by suitable corrective measures. If VIS is more than 200 on two or more occasions for the same analyte, then standardization procedures need to be checked.[8] Standard Deviation Index (SDI) is another EQAS Performance indicator used. It is a measure of relative bias.The standard deviation index is a measurement of bias (how close your value is to the target value).

The following formula is used to calculate SDI

Standard Deviation Index (SDI): difference between laboratory value and target value/ SD of mean for comparison group

Interpretation of SDI

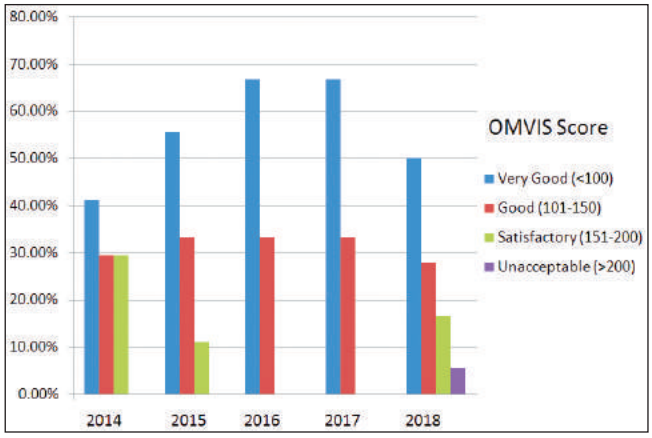
SDI Score	Interpretation
0.00	Perfect comparison with consensus group
<1.25	Acceptable
1,25-1.49	Acceptable to marginal performance. Some investigation of the test system may be required.
1.50-1.99	Marginal performance.
2.0-3.0	Warning Signal . Investigation of the test system is recommended
>3.0	Unacceptable performance. Action Signal

Results:

Table 1. Based on OMVIS of all study parameters, Percentage of Total Test results with different score categories of VIS from March 2014 to October 2018.

VIS Score	2014 %	2015 %	2016 %	2017 %	2018 %
Very Good (<100)	41.2	55.6	66.7	66.7	50.0
Good (101-150)	29.4	33.3	33.3	33.3	27.8
Satisfactory (151-200)	29.4	11.1	0	0	16.6
Unacceptable (>200)	0	0	0	0	5.5

Figure 1. OMVIS score of all test parameters with Total percentage of all tests parameters in different score categories of VIS from March 2014 to October 2018.



After performing analysis for OMVIS of each parameter for the study year 2014- 2018, it is observed that performance is very good(i.e. OMVIS<100) in 41.2% of total test results in the year 2014 and 55.6.9% of total test results in the year 2015. As far as the VIS of the year 2016-2017 is concerned, the OMVIS<100 score value is 66.7% of total test results. OMVIS with very good performance in 2018 is 50%.

Figure 2. Parameters showing Very good performance According to OMVIS Score from March 2014 to October 2018.

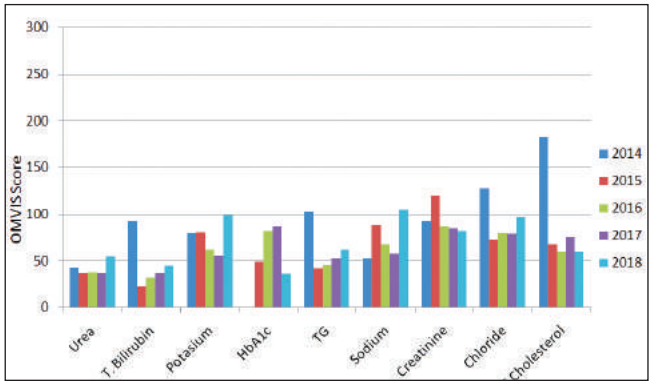
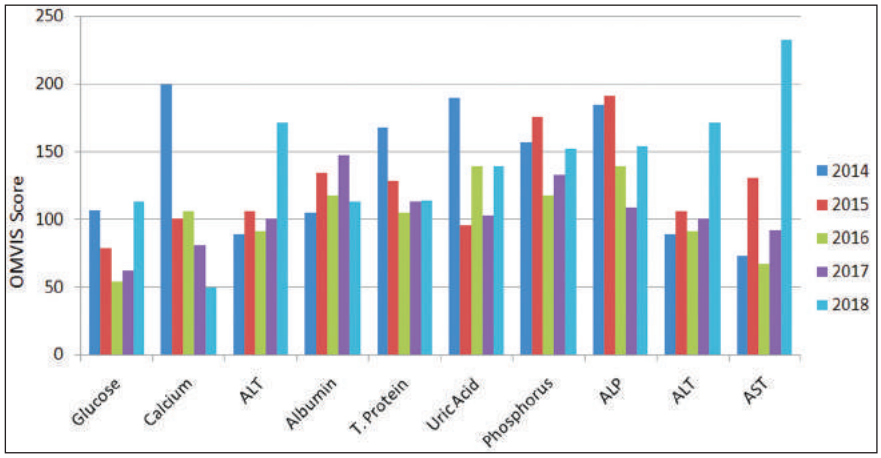


Figure 2. Parameters showing Poor performance According to OMVIS Score from March 2014 to October 2018



The overall performance of our laboratory in terms of OMVIS for all study years (2014-2018) were expected with majority of the values falling in the <200 score category which is acceptable and satisfactory. Moreover none of the OMVIS values had crossed >200 ever since our participation in EQAS programme except AST in 2018. However the VIS for AST crossed the mark of >200 in the months of January, June, July and August in 2018 and July- 2015. The possible reasons could be reagent onboard stability and this was corrected by recalibration of AST. Phosphorus crossed the acceptable limit in June, August, September and October in 2018 and Feb-2017 and January and June-2016 and October, November and December 2014 and 2015 these may be due to inconsistencies in the maintenance of water purity.

Calcium in March to August 2014 and June 2016 may be due to inconsistencies in the maintenance of water pH.

Cholesterol(March-2017 and May, September, December-2014), TG (May-2018, May, June-2014) and Chloride (June-2016, April and September-2014)

Parameters showing very good performance in term of AverageSDI of all parameters in recent year from Jan 2018 to October 2018.

Para-meters	Cal-cium	HbA1c	T. Bil	T. Chol.	Urea	TG	K	Uric acid	Albu-min	Phos-phorus	Na	T. Protein	Creat
Average SDI	0.03	0.29	0.42	0.46	0.50	0.50	0.55	0.56	0.64	0.65	0.66	0.68	0.72

Parameters showing poor performance in term of Average SDI of all parameters in recent year from Jan 2018 to October 2018.

Parameters	AST	Glucose	ALP	ALT	Chloride
Average SDI	2.3	1.6	1.19	0.85	0.72

Another performance indicator utilized by EQAS body is Standard Deviation Index (SDI). SDI is calculated every monthly for each parameters. Jan-2018 to October-2018 SDI were included and Average SDI was calculatedfor 2018 for each parameter. Majority of the results were observed to be in the range of excellent to good in all years of the study period. Based on recent year 2018 Average SDI values it is clear that we have improved our performance of particularly those parameters which has shown unsatisfactory or fluctuating results in previous years. Few parameters of concern are AST, Glucose, ALP. Overall performance in term of SDI from Jan-October 2018 is Acceptable (SDI<1.25).

Discussion

Quality control emphasizes at not only statistical methods but also non-statistical control procedures like linearity checks, reagent and standard checks, temperature monitoring that detect problems early enough to prevent their consequences and provide valid and reliable laboratory results. Quality of laboratory results can be accurate and reliable by properly channeling efforts for achieving good Internal Quality Control and enrolling in External Quality Assessment Scheme to know problem areas that need further work. EQAS in Clinical biochemistry laboratory evolved as a powerful tool for improving quality of laboratory service.

Laboratory performance was evaluated by comparing our results with other EQAS participating laboratory in term of EQAS Performance Indicators like VIS and SDI

Our EQAS results in term of OMVIS from March 2014 to December 2017 (100% results with OMVIS <200) are in acceptable range. Our performance in term of OMVIS with very good VIS score (<100) were 41.2%, 55.6%, 66.7 %, 66.7 % of total test results in year 2014, 2015, 2016 and 2017 respectively. For the year 2018 all parameters with VIS Score <200 except AST with 50% of total test results were in very good VIS Score <100. From 2014 onwards our laboratory performance has been showing improving trend but in 2018 some problem areas have been identified which need to be worked on.

Basic protocol being followed when EQAS results are out of range

Checking of storage and expiry condition of reagents, calibrator and quality control material

⇩

Check the operating environmental conditions like Temperature (20-30^{0}C), humidity (<95%) and laboratory water purity

⇩

Trouble shooting like Probe inspection, cleaning/priming and system check

⇩

Re-run EQAS

⇩

Recalibrate and re-run EQAS

⇩

Calibration with fresh reagents and re-run EQAS

Report the result after corrective action

It was found that for some parameters like ALT & AST frequent reagent change of different companies was crux of problem and efforts have been made to invoke proper inventory management to avoid this. Most of the problems were with reagent stability because of temperature and humidity variation. These were subsequently dealt with by checking for onboard stability for all parameters and recalibration. Another issue was improper handling and reconstitution of EQAS samples by technicians. This was addressed by attempting to include more training sessions for correct handling and overall awareness about quality. Purity of water used in laboratory is also one of concerns, which may that affect the EQAS results; this problem was addressed and corrected with the help of water system engineer.

EQAS program and its role in clinical laboratory

For clinical biochemistry laboratory, EQAS has broader scope which help in participant performance evaluation it can also be used as a tool for method performance evaluation, post-market vigilance, training and help. Medical Laboratories quality management is dynamic process, which keeps evolving and requires updating. EQAS programs provide platform where each laboratory can compare and evaluate their methodology and laboratory practices with other participating laboratories and keep abreast of their lacunae in services, problem areas that need immediate redressal.[9,10]

Participation within a recognized external quality assurance scheme has many benefits, including relevant information on relative performance of different methods, knowledge about one's own ability to perform tests and report results accurately as well as gaining confidence of clinicians and patients. EQAS performed by independent external agency with objective to ensure & maintain long-term accuracy of analytical method. For clinical biochemistry laboratories, EQAS have been founduseful for inter laboratory comparability which helpful in solving methodological, technical and other issues and helps in achieving ultimate aim of enriched quality of laboratory service.

Conclusion

The overall performance of our laboratory in terms of Variation Index Score (VIS) is showing improving trend. The participation in EQAS has helped us to emerge as a worthy laboratory service provider by pointing out at facets of problem and hence identify ways of dealing with it. Few parameters showing poor performance have helped us to identify deficiencies and helped us to improve. EQAS not only intends to improve overall quality and confidence of laboratory test reporting but also provide a stepping-stone to improve.

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GENERAL

The Dengue sting is biting

PARIMA MITTAL, VIJAY THAWANI

Key facts[1]

- Dengue is a mosquito borne viral infection.
- It causes flulike illness, and occasionally develops into a potentially lethal complication.
- The global incidence of dengue has grown in recent decades. About half of the world's population is now at risk.
- Dengue is found in tropical and sub-tropical climates worldwide, mostly in urban and semi-urban areas.
- Severe dengue is a leading cause of serious illness and mortality among children in some Asian and Latin American countries.
- There is no specific treatment for dengue, but early detection and access to proper medical care lowers the fatality rate below 1%.
- Dengue prevention and control depends on effective vector control measures.

Introduction[1]

Dengue is a mosquito-borne viral disease that has rapidly spread in all regions. Dengue virus is transmitted by female mosquito mainly of the species Aedes aegypti and to a lesser extent Ae Albopictus, which breed in fresh water. These mosquitos also transmit chikungunya, yellow fever and zika infections. Dengue is widespread throughout the tropics, with local variation in risk influenced by rainfall, temperature and unplanned rapid urbanization.Severe dengue – the Dengue Hemorrhagic Fever (DHF), was recognized in the 1950s during dengue epidemics in the Philippines and Thailand. Now DHF affects most Asian and Latin American countries and has become a leading cause of hospitalization and death. There are four distinct closely related, serotypes of the virus that cause dengue (DEN-1 to 4). Recovery from infection by one provides lifelong immunity against that particular serotype. However, cross-immunity to the other serotypes after recovery is partial and temporary. Subsequent infections by other serotypes increase the risk of DHF.

Transmission[1]

The Ae mosquito is the primary vector of dengue. The virus is transmitted to humans through the bites of infected female mosquitoes. After virus incubation for 4–10 days, an infected mosquito is capable of transmitting the virus for the rest of its life. Infected symptomatic or asymptomatic humans are the main carriers and multipliers of the virus, serving as a source of the virus for uninfected mosquitoes. Patients who are already infected with the dengue virus can transmit the infection (for 4–5 days; maximum 12) via Ae after their first symptoms appear. The Ae mosquitos live in urban habitats and breed mostly in man-made containers. Unlike other mosquitoes Ae is a day-time feeder; its peak biting being in the morning and in the evening before dusk. Female Ae bites multiple people during each feeding period.

Ae.albopictus, a secondary dengue vector in Asia, has spread to North America and more than 25 countries in the European region due to the international trade in used tires (a breeding habitat) and other goods (e.g. lucky bamboo). Ae.albopictus is highly adaptive and, therefore, can survive in cooler temperate regions of Europe. Its spread is due to its tolerance to temperatures below freezing, hibernation, and ability to shelter in microhabitats.

Transmission of the Dengue Virus[2]

Dengue is transmitted between people by the mosquitoes Ae aegypti and Ae albopictus, which are found throughout the world. Insects that transmit disease are vectors. Symptoms of infection usually begin 4 – 7 days after the mosquito bite and typically last 3-10 days. For transmission to occur the mosquito must feed on a person during a 5 day period when large amounts of virus are in the blood; this period usually begins before the person become symptomatic. Some people never have significant symptoms but can still infect mosquitoes. After entering the mosquito in the blood meal, the virus requires an additional 8-12 days incubation before it can then be transmitted to another human. The mosquito remains infected for the remainder of its life, which might be days or a few weeks.In rare cases dengue can be transmitted in organ transplant or blood transfusion from infected donors, and from an infected pregnant mother to her fetus. But in the vast majority

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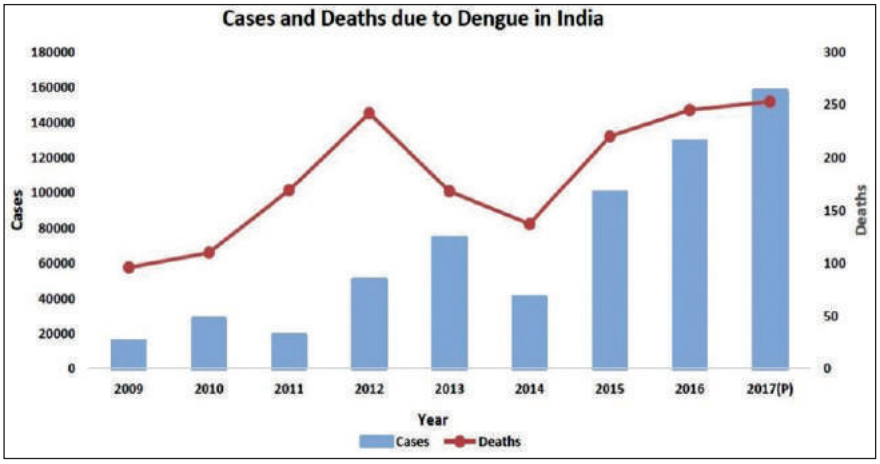
of infections, a mosquito bite is responsible.

In many parts of the tropics and subtropics, dengue is endemic, and occurs every year, usually during a season when Ae mosquito populations are high, often when rainfall is optimal for breeding. These areas are additionally at periodic risk for epidemic dengue, when large numbers of people become infected during a short period. Dengue epidemics require a coincidence of large numbers of vector mosquitoes, large numbers of people with no immunity to one of the four virus types DENV 1 to 4.



Source: Directorate of National Vector Borne Disease Control Programme, Dte.GHS, Ministry of Health & Family Welfare

Source: https://www.downtoearth.org.in/news/health/number-of-dengue-cases-in-2017-was-the-highest-in-a-decade-60982

Dengue Fever[3]

The dengue fever (DF) is a self-limiting fever, lasting for 5–7 days. It is sometimes debilitating during the acute illness. The clinical features of DF vary according to the age of the patient. The infants and young children may have undifferentiated febrile sickness with maculopapular rash. The older children and adults may have mild febrile syndrome or severe disease with high fever, severe headache, retro orbital pain, myalgia, arthralgia, nausea, vomiting, and petechiae. Leucopenia and thrombocytopenia are present in all ages. In some cases DF may be accompanied by bleeding complications such as gingival bleeding, epistaxis, gastrointestinal bleeding, haematuria, and menorrhagia.

DHF and Dengue Shock Syndrome (DSS)[3]

The DHF is characterized by symptoms of DF along with thrombocytopenia, hemorrhagic manifestations, and plasma leakage. A positive tourniquet test is suggestive of DHF. Plasma leakage determines disease severity in DHF. It is also the most important difference between DHF and DF. Depending on disease severity and clinical manifestations, DHF is divided into four grades I to IV, with grade IV being the most severe. There may be fine petechiae scattered on the extremities, axillae, face, and soft palate, in the febrile period. The critical phase is usually reached at the end of febrile illness, marked by rapid decrease in temperature and often accompanied by circulatory disturbances including plasma leakage, hemoconcentration, and thrombocytopenia.In severe cases, with critical plasma loss, DSS ensues and may be life threatening if not treated properly. The DSS is characterized by a rapid, weak pulse with narrowing pulse pressure (<20 mm of Hg), cold clammy skin, and restlessness. The patient may die within 12–24 h of going into shock or recover rapidly with volume replacement therapy.

Signs and symptoms[4]

Many people, especially children and teens, may experience no signs or symptoms during a mild case of DF. Symptoms begin four to 10 days after being bitten by an infected mosquito. Signs and symptoms of DF include fever 106 F (41 C), headache, muscle, bone and joint pain, pain behind eyes, rash, nausea and vomiting, minor bleeding from gums or nose.Most people recover within a week or so. In some cases, symptoms worsen and can become life-threatening. Blood vessels become damaged and leaky and the number of clot-forming cells (platelets) in bloodstream drops. This can cause bleeding from nose and mouth, severe abdominal pain, persistent vomiting, bleeding under the skin, which might look like bruising, problems in lungs, liver and heart.

Dengue on the rise[5]

The number of dengue cases in 2017 was the highest in a decade.5There has been >300% hike in dengue cases since 2009, and deaths in 2017 was the highest in the last one decade. The spike in cases of dengue was the highest in the last one decade, according to the data from National Vector Borne Disease Control Programme (NVBDCP) and National Health Profile 2018. From < 60,000 cases in 2009, the cases increased to 188,401 in 2017 - more than a 300% spike.

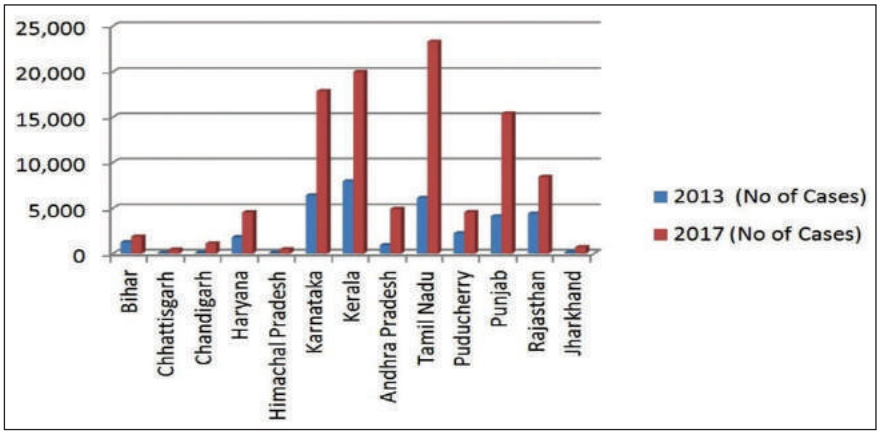
Maximum rise in southern and northeastern states of India[5]

Northeastern (NE) states such as Sikkim, Nagaland, Mizoram and Tripura have seen the highest leap in terms of percentage, and the southern states shared the maximum numbers. The four states had collectively recorded 66, 057 cases, which is close to 40 % of the total cases recorded in the country.West Bengal, Punjab and Orissa were the worst hit states, with most of the outbreaks concentrated in western, southern and eastern India.NE states such as Mizoram, Sikkim and Tripura saw between 1500 -1700 % rise in cases between 2013 and 2017. Dengue cases are on the rise in Kerala. Kasargod district recorded 328 dengue cases.

The national capital has also seen its dengue cases almost double up during this period. Dengue Cases Crossed 1,000 in Delhi this season with 539 of the dengue cases in the first three weeks of October, which accounts for over 52% of the total cases reported this season.

Epidemiology[6]

The prevalence of dengue, based on testing of more than 200,000 clinically suspected patients from 180 Indian studies was 38.3%. The pooled estimate of dengue seroprevalence in the general population and CFR among laboratory confirmed dengue patients was 56.9% and 2.6% respectively. There were no community based studies reporting incidence of dengue. Identified gaps in the understanding of dengue epidemiology in India emphasize the need to initiate community-based studies in different geographic regions to generate reliable estimates of age-specific incidence of dengue and studies to generate dengue seroprevalence data in the country.



Source: https://www.downtoearth.org.in/news/health/number-of-dengue-cases-in-2017-was-the-highest-in-a-decade-60982

Dengue burden growing rates[6]

According to the WHO, dengue is the fastest growing mosquito-borne disease across the world causing nearly 400 million infections every year. India in 2017 has seen 157220 cases of dengue and 250 deaths due to the disease (till December 24), as per the National Vector Borne Disease Control Programme (NVBDCP) data. In 2016, the country registered 129166 cases and 245 deaths.

Dengue in India[6]

In India, dengue is endemic in almost all states and is the leading cause of hospitalization. The DF had a predominant urban distribution till few decades back, but is now also reported from peri-urban as well as rural areas. Surveillance for DF in India is conducted through a network of >600 sentinel hospitals under the NVBDCP, Integrated Disease Surveillance Program (IDSP) and a network of 52 Virus Research and Diagnostic Laboratories (VRDL) established by Department of Health Research. In 2010, an estimated 33 million cases occurred in the country. During 2016, the NVBDCP reported more than 100,000 laboratory confirmed cases of dengue.It is therefore possible that dengue burden is grossly underestimated in India.

Discussion[6]

Most of the published literature is hospital/ laboratory-based surveillance studies or reports of dengue outbreak investigations. There was no community-based epidemiological study reporting the incidence of DF. Among the clinically suspected DF patients, the estimated prevalence of laboratory confirmed dengue infection was 38%. The burden of dengue was variable in studies conducted in different settings. Most of the laboratory confirmed dengue cases in India occurred in young adults. Dengue positivity was higher between August and November, corresponding to monsoon and post-monsoon season in most states of India.

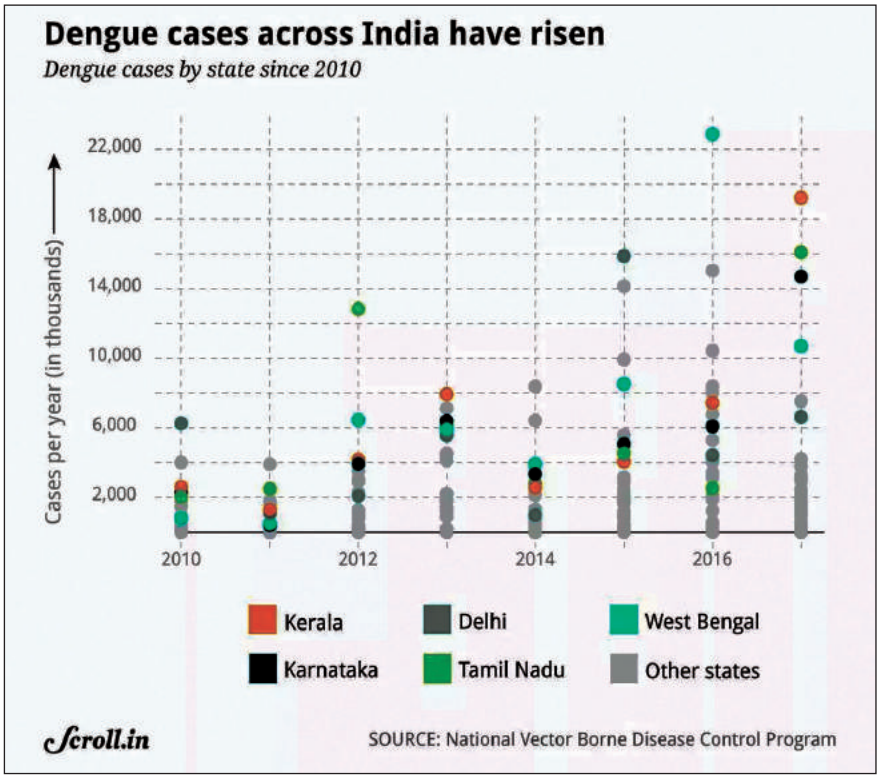
Information about seroprevalence of dengue in the general population is a useful indicator for measuring endemicity of DF. The dengue vaccine (CYD-TDV) manufactured by Sanofi Pasteur was introduced in two sub-national programs in Philippines and Brazil and it has been suggested that vaccine acts by boosting the naturally acquired immunity. WHO SAGE conditionally recommends the

use of this vaccine for areas in which dengue is highly endemic as defined by seroprevalence in the targeted population for vaccination. Optimal benefits of vaccination of seroprevalence in the age group targeted for vaccination was ≥ 70%. In 2018, WHO revised the recommendation from population sero-prevalence criteria to pre-vaccination screening strategy. The pooled estimate based on the seven studies conducted in India indicated dengue seroprevalence of 57%. However, this is not representative of the country, as these studies were conducted only in 12 Indian states, and some had used a convenience sampling method.

The computed pooled estimate of case fatality due to dengue in India was 2.6% with a high variability in the reported CFRs. The lower CFR estimates could be on account of under-reporting of deaths due to dengue, or inclusion of higher number of mild cases in the denominator. The information about severity of dengue cases is not available from NVBDCP surveillance data. The published studies from India indicate presence of all the four dengue serotypes, with DEN-2 and DEN-3 being the more commonly reported serotypes. Two third of the studies reported circulation of more than one serotype. Co-circulation of multiple serotypes was evident from the studies in Delhi. More than two third (16/19) studies from Delhi reported circulation of more than one serotype; and most of the studies conducted in the last decade identified co-circulation of more than one serotype. More than two-fifth of the laboratory confirmed infections were secondary dengue infections and nearly one-fourth of the cases were severe in nature. Circulation of numerous dengue serotypes increases the probability of secondary infection, leading to a higher risk of severe dengue disease.

India's rising temperatures are worsening the dengue crisis[7]

India's mean temperature rose by >0.5 C between 1960 and 2009. Researchers found that an increase in temperature led to shorter viral incubation. Among the five dengue endemic states viz.Punjab, Haryana, Rajasthan, Gujarat, and Kerala, the correlation between mean temperature and EIP was studied. The effect of rainfall on dengue was also assessed. The extrinsic incubation period being the time from when the mosquito acquires the virus to the time it is infectious to transmit the dengue virus to a person on biting. It was found that the states where temperatures were higher, the extrinsic period was low which means that the mosquitoes were turning infectious in a very short period of time of getting infected with the dengue virus. This triggered a rapid transmission of dengue in the community. Kerala, Tamil Nadu, and Karnataka reported the highest burden of dengue cases this year. Coastal states, including Kerala, showed a very low extrinsic incubation period which could result in the high transmission of cases. Temperature >33C are not conducive to mosquito breeding hence it can limit transmission of the dengue virus. Intermittent rains also play a role in determining the temperatures. The NVBDCP counts only those cases confirmed by ELISA test but it ignores dengue positive found by another cheaper, faster and popular NS-1 antigen test. Thus many patients do not get counted.



Source: https://qz.com/india/1118272/indias-rising-temperatures-are-worsening-its-dengue-crisis/

Diagnosis[8]

If dengue is suspected, the following tests need to be done.

Initial test:

IgM and IgG tests detect dengue in the initial stages of infection, but since they throw up false positive and false negative results, a confirmatory test is needed. A positive IgG but a low or negative IgM, for example, indicates past dengue infection.

Confirmatory test:

The NS1 Elisa-based antigen test is done after three days after symptoms of fever body ache, headache or nausea appear.

Platelet count:

Platelets help the blood clot and stop bleeding. Very low levels – the normal range is between 150,000 and 450,000 platelets per microlitre of blood – lead to internal bleeding and shock, which results in death from multi-organ failure.

< 150,000: Get platelet count measured once in two days.

<100,000: Platelet count must be done once a day.

<60,000: Measure twice a day. Also a daily test is needed if the rate of drop is 50% or more within 24 hours.

<30,000 or if one is bleeding is a medical emergency and needs hospitalization.

<10,000: Blood transfusion is needed

Treatment[8]

Indian scientists have made an Ayurvedic drug to cure dengue claiming it to be the first in the world. The Central Council for Research in Ayurvedic Sciences (CCRAS), under the Ministry of AYUSH and ICMR's regional research centre in Belgaum, Karnataka, have conducted pilot studies which proved the clinical safety and efficacy of the drug. Adouble blind placebo controlled clinical trial is continuing in the medical colleges of Belgaum and Kolar. This drug has been made with seven herbal ingredients which are in use in Ayurveda since centuries.

Immunization[9]

The first vaccine against dengue, Dengvaxia® (CYD-TDV) developed by Sanofi Pasteur was licensed in 2015 and has been approved by regulatory authorities in 20 countries for use in endemic areas in persons of 9-45 years of age. In April 2016, WHO issued a conditional recommendation on the use of the vaccine for areas in which dengue is highly endemic as defined by seroprevalence of 70% or more. In 2017, the results of an additional analysis to retrospectively determine serostatus at the time of vaccination were released. The analysis showed that the subset of trial participants who were inferred to be seronegative at the time of first vaccination had a higher risk of more severe dengue and hospitalization from dengue compared to unvaccinated participants.

WHO position on vaccination for Dengue[9]

The live attenuated dengue vaccine CYD-TDV has been found to be efficacious and safe in persons who have had a previous dengue virus infection (seropositive individuals), but carries an increased risk of severe dengue in those who experience their first natural dengue infection after vaccination (seronegative individuals).

For countries considering vaccination as part of their dengue control programme, pre-vaccination screening is recommended. With this strategy, only persons with evidence of a past dengue infection would be vaccinated (based on an antibody test, or on a documented laboratory confirmed dengue infection in the past). Decisions about implementing a pre-vaccination screening strategy will require careful assessment including consideration of the sensitivity and specificity of available tests and of local priorities, dengue epidemiology, country-specific dengue hospitalization rates, and affordability of both CYD-TDV and screening tests.

Vaccination should be considered as part of an integrated dengue prevention and control strategy. There is an ongoing need to adhere to other disease preventive measures such as well-executed and sustained vector control. Individuals, whether vaccinated or not, should seek prompt medical care if dengue-like symptoms occur.

Therapeutic intervention[10]

Symptomatic management[10]

No specific antiviral medication is currently available to treat dengue. The treatment of dengue fever is symptomatic and supportive. Bed rest and mild analgesic-antipyretic therapy are often helpful in relieving lethargy, malaise, and fever associated with the disease. Paracetamol is recommended for treatment of pain and fever. Aspirin, other salicylates, and nonsteroidal anti-inflammatory drugs (NSAIDs) should be avoided.

Precautions and Drug Interactions

The drug should be used with caution in individuals with bleeding disorders or those taking blood thinning medications such as aspirin or warfarin. Co-administration of extracts of Carica papaya with oral hypoglycemic

may lead to very low blood glucose. Thus it is important to closely monitor the blood glucose levels regularly. It has been found to increase the bioavailablity of amiodarone and therefore the dose should be adjusted accordingly when coadministered with carica papaya leaf extract.In vitro study demonstrated potentiating the action of various antibiotics like penicillin G, ampicillin, amoxyclav, cephalothin,polymyxin B, rifampicin, amikacin, nalidixic acid, gentamycin, cholarmphenicol, oflxacin when coadministered with C.Papaya. The extract of C. papaya with antimicrobial agents possesses synergistic properties which act against the pathogenic organisms.

Adverse effects:

Nausea, vomiting, abdominal pain, heartburn, dyspepsia.

Management of the critical phase[11]

Fluid resuscitation[11]

The key management strategy during the critical phase is judicious fluid administration. The fluids used for volume expansion include normal saline, Ringer lactate, 5% glucose diluted 1:2 or 1:1 in normal saline, plasma, plasma substitutes, or 5% albumin.

Fluid must be administered orally as much as possible. IV supplementation is necessary when the patient is not able to take fluids orally (severe vomiting, prostration) or shock.The rationale of fluid management is to keep enough fluid in the vascular system during the leakage phase to avoid hypovolemia and also avoid overloading the patient with too much fluid.The recommended first-line IV fluid is crystalloids (0.9% saline).In situations of shock, immediate resuscitation with 20 mL/kg bolus is recommended until blood pressure becomes recordable..Colloids (e.g. dextran) are recommended as second-line therapy when hypotension is not responsive to boluses of IV crystalloids.

A rise in hematocrit indicates further hemoconcentration due to leakage, and hence need for more fluids. However a drop in hematocrit may be due to either convalescence (reabsorption of extravasated fluid) or internal bleeding. If the patient is still ill and in critical phase with low platelet counts, always suspect bleeding. Sometimes there may not be any overt external manifestations of bleeding. In cases of suspected bleeding, the management strategy is transfusion of fresh whole blood. Administration of fluids should be guided by frequent monitoring and assessment of intravascular volume status during the critical stage, and fluids should never be administered at a constant rate without monitoring.

Blood products[11]

Platelet transfusion is given to patients who develop serious hemorrhagic manifestations or have very low platelet count. Transfused platelets survive only for a short period in patients with shock. There is some evidence of benefit with fresh frozen plasma transfusion in increasing platelet counts, although the effect of plasma transfusion in dengue shock has not been studied in a controlled clinical trial. Blood transfusion is required in patients with severe hemorrhage, but there are no published data on its use.

Recovery phase[11]

There is no need to restrict fluids as the patient recovers. The entire fluid amount can be given orally. However, close monitoring is necessary to recognize heart failure or pulmonary edema during recovery especially in patients with comorbidities such as congenital heart disease, ischemic heart disease, hypertension, and diabetes mellitus.

Corticosteroids[11]

WHO guidelines for management of dengue do not recommend the use of corticosteroids.

A randomized controlled trial compared the use of nasal continuous positive airway pressure (NCPAP) versus oxygen by mask in 37 Vietnamese children with dengue shock state and acute respiratory failure.It was shown that NCPAP effectively decreased hypoxemia and reduced the number of children requiring intubation and ventilation. Thus, NCPAP appears to be an effective treatment in acute respiratory failure associated with dengue shock state.

Carbazochrome sodium sulfonate (AC-17), a hemostatic drug with a capillary-stabilizing action, reduces the vascular hyperpermeability induced by vasoactive substances through an agonist-induced inhibition of phosphoinositide hydrolysis. Its effect in severe dengue was investigated in a small randomized clinical trial conducted in 95 Thai children. The primary outcome measure was prevention of capillary leakage, as evidenced by the presence of pleural effusion, and the secondary outcome was prevention of shock. No evidence of benefit in either outcome measure was seen using AC-17 for treatment of dengue shock state, although the study was underpowered to detect a potential treatment benefit.

The role of different inotropic and vasopressor agents in dengue shock has not been investigated in clinical trials. Vasopressor drugs such as noradrenaline and

dopamine are indicated in shock that is unresponsive to fluids, but no clinical trials are available on their use in dengue. In the case of cardiac dysfunction, it is appropriate to use cardiac inotropic drugs such as dobutamine or adrenaline in combination with a vasopressor, although, again, no evidence is available.

Caripill[12]

It is a formulation of Tablets or Syrup containing papaya (Carica papaya) leaf extract.Each Caripill tablet contains 1100 mg of Carica papaya leaf extract and Caripill Syrup contains 275 mg / 5 ml Carica papaya leaf extract. The extract in Caripill is found to be useful in increasing the platelet count.This medicinal use of Caripill is proven through clinical studies in patients in India and other parts of the world with low platelet count associated with dengue.One tablet of Caripill (1100mg) should be taken three times a day, for five days.For children > 1 year and <5 years the dose is 275mg (5ml) three times a day for 5 days.For children >5 years and <18 years the dose is 550mg (10ml) three times a day for 5 days.

Prevention and control[12]

At present, the main method to control or prevent the transmission of dengue virus is to combat vector mosquitoes by preventing mosquitoes from accessing egg-laying habitats by environmental management and modification;disposing of solid waste properly and removing artificial man-made habitats;covering, emptying and cleaning of domestic water storage containers on a weekly basis;applying appropriate insecticides to water storage outdoor containers;using of personal household protection such as window screens, long-sleeved clothes, insecticide treated materials, coils and vaporizers;improving community participation and mobilization for sustained vector control;applying insecticides as space spraying during outbreaks as one of the emergency vector-control measures;active monitoring and surveillance of vectors should be carried out to determine effectiveness of control interventions.

Prevention of breeding Mosquito[12]

The best way to reduce mosquitoes is to eliminate the places where the mosquito lays her eggs, like artificial containers that hold water in and around the home. In urban areas, Ae.mosquitoes breed on water collections in artificial containers such as plastic cups, used tires, broken bottles, flower pots, etc. Periodic draining or removal of artificial containers is the most effective way of reducing the breeding grounds for mosquitoes.Larvicide treatment is effective incontrolling the vector larvae but the larvicide chosen should be long-lasting. There are some very effective insect growth regulators (IGRs) available which are both safe and long-lasting (e.g. pyriproxyfen). For reducing the adult mosquito load, fogging with insecticide is effective.

To eliminate standing water unclog roof gutters, empty children's pools at least once a week, change water in birdbaths at least weekly, get rid of old tyres in yard, as they collect standing water, empty unused containers, such as flower pots, regularly or store them upside down; drain any collected water from a fire pit regularly.

Prevention by reducing mosquito bites[12]

Prevention of mosquito bites is another way of preventing disease. The adult mosquitoes like to bite inside as well as around homes, during the day and at night when the lights are on. To protect, use insect repellent on skin while indoors or out, mosquito traps or mosquito nets. Wear long sleeves and pants for additional protection. Window and door screens are secure and without holes and use mosquito nets.

Clothing tips[12]

Wear long-sleeved shirts, long pants and socks, Wear light-colored clothing, since mosquitoes are more attracted to darker colors, Apply mosquito repellent to clothing, shoes, and camping gear and bed netting, wear a full-brimmed hat to protect head and neck, consider wearing a mosquito net to cover head and face or torso.

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Air pollution kills

HRISHIKA GUPTA, VIJAY THAWANI

Around 93% of world children, below 18 years age, live in polluted air environments with pollution levels above the World Health Organisation (WHO) guidelines. In 2016, 5.4 lakh children under 5 years of age died from respiratory tract infections caused by polluted air. Air pollution is one of the leading threats to child health, accounting for almost 1 in 10 deaths in children under five years of age. A WHO study emphasizes the need for stronger actions to achieve breathable air. Greenpeace reports out that India has some of the world's biggest NO2 emissions hotspots, making India one of the most polluted countries in the world.[1]

Current status of air pollution in India

The 2016 air monitoring stations' data of 4,300 cities indicates that Indian cities suffer the most.11 of the 12 cities with the highest levels are Indian. Kanpur with population of 3 million tops the list with yearly average of 173 micrograms per cubic meter of particulate matter (PM) 2.5 - the most hazardous particle. Bamenda, Cameroon, is the only city outside of India in the top 12.[2]

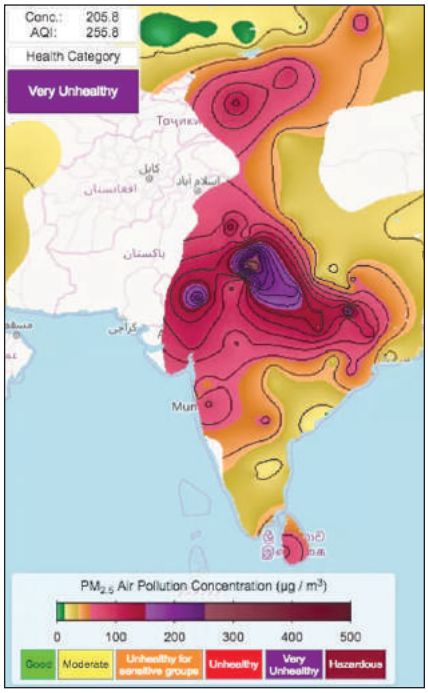
Cities with the highest small particulate measurements in the world

Country	City	PM2.5 (µg/m³)
India	Kanpur	173
India	Faridabad	172
India	Varanasi	151
India	Gaya	149
India	Patna	144
India	Delhi	143
India	Lucknow	138
Cameroon	Bamenda	132
India	Agra	131
India	Muzaffarpur	120
India	Srinagar	113
India	Gurgaon	113

From: World Health Organization. Irfan U. Why India's air pollution is so horrendous.Vox. Available at: https://www.vox.com/2018/5/8/17316978/india-pollution-levels-air-delhi-health.

Different air pollutants can impact health viz. nitrogen oxide, carbon monoxide, and ozone to name a few.The database classifies air pollution in two ways- PM2.5, particles smaller than 2.5 microns in diameter, and PM 10, particles that are 10 microns in diameter. The smaller PM2.5 particles from sources like open flames and diesel exhaust can linger in the air longer and penetrate deeper into the lungs than larger particles, which is why they are the bigger concern for health officials and a high-priority target for reduction.

It is clear from the report that India is one of the riskiest countries in the world to breathe. When it comes to comparing PM10 measurements of the world's largest cities, India's capital Delhi comes in with an annual average of 292, ahead of Cairo (284), Dhaka (147), Mumbai (104), and Beijing (92).



Map of particulate air pollution in India on October 31, 2018. Berkeley Earth.Irfan U. Why India's air pollution is so horrendous.Vox.https://www.vox.com/2018/5/8/17316978/india-pollution-levels-air-delhi-health. This map provides near real time information on particulate matter air pollution <2.5 microns in diameter (PM2.5).The data presented here are from surface stations measurements, and tend to be a couple hours behind real time.[2]

Delhi is like a toxic gas chamber[3]

Delhi, the sixth-most populated metropolis in the world (second largest if the entire NCR is included), is one of the most heavily polluted cities in India, having country's highest volumes of particulate matter pollution. Air quality index (AQI) of Delhi is generally of Moderate

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(101-200) level between January to September, and then it drastically deteriorates to Very Poor (301-400), Severe (401-500) or even Hazardous (500+) levels in three months between October to December every year due to various factors including stubble burning in farms, fire crackers burning during Diwali and cold weather.

Delhi has worst air quality after Diwali[4]

The AQI of Delhi was recorded at "severe-plus emergency" category due to rampant bursting of toxic firecrackers. After Diwali, the overall AQI in Delhi jumped to 642 which is "severe-plus emergency" category, according to the Centre-run System of Air Quality and Weather Forecasting And Research (SAFAR).An AQI between 0 and 50 is considered "good", 51 and 100 "satisfactory", 101 and 200 "moderate", 201 and 300 "poor", 301 and 400 "very poor", and 401 and 500 "severe". The AQI above 500 falls in the "severe-plus emergency" category. Currently the Delhi AQI is 500+. The overall AQI of the city was 11 times more than the permissible limit.

Major causes of air pollution in India[5]

1. Industrial Chimney Waste:

It is a major source of the air pollution. The chief pollutants are SO_2 and NO_2. For example, the Mathura based petroleum refinery is a threat to the whiteness of Taj Mahal in Agra and other monuments at FatehpurSikri. The cement factories release lots of dust, which is a major health hazard. There are many food and fertilizers industries which emit acid vapours in the air.

2. Thermal Power Stations:

More than 50% of the power demand is met by thermal power stations in the country.The coal consumption of thermal plants is several million tonnes. The chief pollutants of this are fly ash, SO_2 and other gases and hydrocarbons. The areas near the power plants have air pollution levels at alarming levels.

3. Automobiles:

The vehicular exhaust is a major source of air pollution. In big and highly dense cities, vehicular exhaust accounts for 70% of all CO, 50% of all hydrocarbons, 30-40% of all oxides and 30% of all SPM. It has been found that a car without cleaning device on burning 1000 gallons of petrol after combustion produces 3200 lb. of CO, 2200-2400 lb organic vapours, 20-75 lb of NO_2, 18 lb of aldehydes, 17lb of sulphur compounds, 2 Lb of organic acids and NH_3 each and 0.3 lb of solid carbons.

4. Burning of Crops Residue:

The practice has been found to be a major source of air pollution. The farms of Haryana and Uttar Pradesh in the vicinity of Delhi, burn crop residue which also causes the temperature to rise by 3°C. Fresh air quality further declines because of mud storm in summers. This brings the pollutants from nearby industrial areas to the residential areas.

5. Cow Dung as a Fuel:

With almost 70% of the population living in the rural areas, cow dung and dry wood is still used by them. The major pollutants from the burning of cow dung and dry wood is CO and NO_2 which are very harmful to health and mainly responsible for lung diseases.

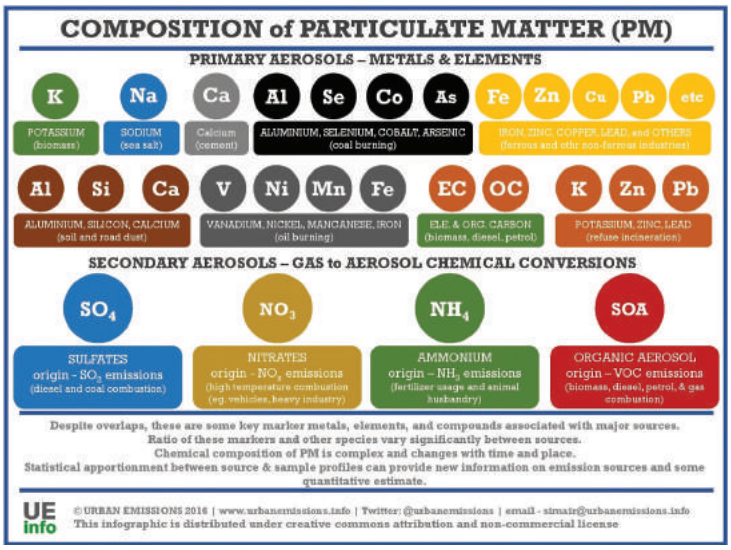
Fine particles are a major concern[6]

Fine PM is an air pollutant of concern for health when levels in air are high. The $PM_{2.5}$ are tiny particles in the air that reduce visibility and cause the air to appear hazy when levels are elevated.The term fine particles, or particulate matter 2.5 ($PM_{2.5}$), refers to tiny particles or droplets in the air that are two and one half microns or less in width. The width of the larger particles in the $PM_{2.5}$ size range would be about thirty times smaller than that of a human hair. The particle size, less than 2.5 micro-meter, is small enough to enter the lungs and blood stream, and stay there for a long time.

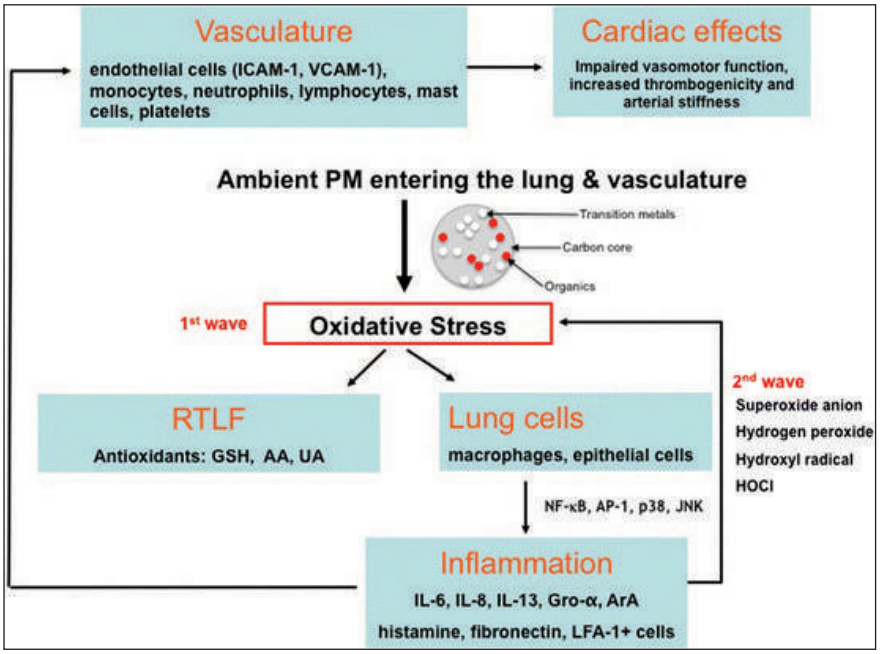
Particles in the $PM_{2.5}$ size range are able to travel deeply into the respiratory tract, reaching the lungs. Exposure to fine particles can cause short-term health effects such as eye, nose, throat and lung irritation, coughing, sneezing, runny nose and shortness of breath. Exposure to fine particles can also affect lung function and worsen medical conditions such as asthma and heart disease. Increase in daily $PM_{2.5}$ exposure leads to increased respiratory and cardiovascular hospital admissions, visit to emergency department in hospital and mortality. Studies suggest that long term exposure to fine particulate matter may be associated with increased rates of chronic bronchitis, reduced lung function and increased mortality from lung cancer and heart disease. People with breathing and heart problems, children and the elderly may be particularly sensitive to $PM_{2.5}$.

Where do $PM_{2.5}$ come from?

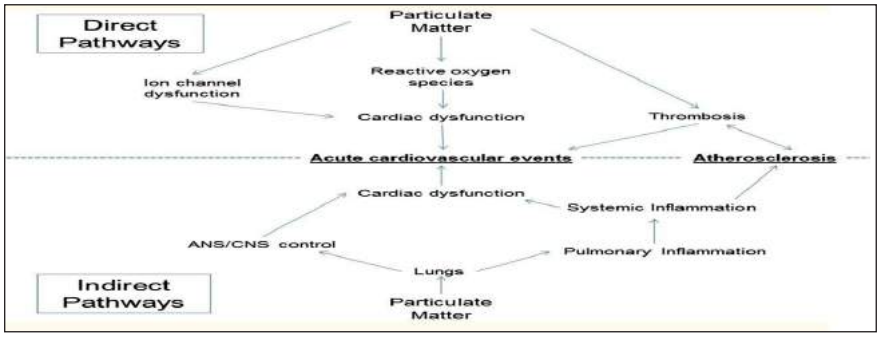
There are outdoor and indoor sources of fine particles. Outside, fine particles primarily come from car, truck, bus, construction equipment, snowmobile, locomotive exhausts, other operations that involve the burning of fuels such as wood, heating



Urban emissions2016.www.urbanemissions.info



RTLF*-Respiratory tract lining fluid.https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4516868/



Pathways by which particulate matter promotes acute cardiovascular events and atherosclerosis. Mechanisms can be broadly divided into direct and indirect pathways.[8] https://www.ncbi.nih.gov.

oil or coal and natural sources such as forest and grass fires. Fine particles also form from the reaction of gases or droplets in the atmosphere from sources such as power plants. These chemical reactions can occur miles from the original source of the emissions.

Mechanisms of PM toxicity[7]

Biological pathways linking PM exposure with oxidative and inflammatory pathways in the lung and cardiovasculature.

Health hazards[9]

The main toxic effects of exposure to the air pollutants are mainly on the respiratory, cardiovascular, ophthalmologic, dermatologic, neuropsychiatric, hematologic, immunologic, and reproductive systems. However, the molecular and cell toxicity may also induce cancers in the long term.

Even small amount of air toxicant is dangerous for susceptible groups including children and elderly people as well as patients suffering from respiratory and cardiovascular diseases.

Respiratory disorders

Increased risk of vocal disturbances, asthma, COPD, bronchitis, emphysema and lung cancer.

Cardiovascular dysfunctions

Short-term exposure to air pollutants can increase the risk of heart attack, stroke, arrhythmias and heart failure in susceptible people, such as the elderly or those with pre-existing medical conditions.It facilitates atherosclerosis development and progression. It also may play a role in high blood pressure, heart failure and diabetes mellitus.

Neuropsychiatric complications

Psychological and toxic

effects of air pollution can lead to psychiatric symptoms, including anxiety and changes in mood, cognition, behaviour and reduction in psychological well-being. Numerous toxic pollutants interfere with the development and adult functioning of the nervous system. Manifestations are often insidious or delayed.

Other long-term complications

Skin aging, inflammatory or allergic reactions like atopic dermatitis, eczema and skin cancer.

Irritation to the eyes, dry eye disease, increased risks of retinopathy and in severe cases blindness.

Children at greater risk of toxic air[10]

Children have greater exposure than adults to the airborne pollutants. Infants and children generally breathe more rapidly than adults, which increase their exposure to pollutants in the air. Infants and children often breathe through their mouths, bypassing the filtering effect of the nose and allowing more pollutants to be inhaled. Children are more susceptible to the health effects of air pollution because their immune system and organs are still immature. Inhaled lead is more easily deposited in the fast-growing bones of children. Irritation or inflammation caused by air pollution obstructs their narrow airways. It takes less exposure to a pollutant to trigger an asthma attack or other breathing ailment due to the sensitivity of a child's developing respiratory system. Exposure to toxic air during infancy or childhood could affect the development of the respiratory, nervous, endocrine and immune systems, and could increase the risk of cancer later in life.

Adverse effects of air pollutants on children's health[11]

Mortality outcomes

Ambient air pollution has been linked to increased mortality in children and adults. There is a consistent and significant association between particulate matter (PM) and postneonatal mortality due to respiratory causes, as well as sudden infant death syndrome. Studies have reported a significant relationship between ambient air level of air pollutants and mortality in children under five years of age.

Adverse pregnancy outcomes

Ambient levels of air pollutants have been associated with adverse pregnancy outcomes, including premature birth, low birth weight, intrauterine growth retardation, abnormal birth length, abnormal head circumference and small size for gestational age. However, no specific trimester has been identified as the most vulnerable period of gestation during which air pollution might be most harmful to the foetus.

Increased risk of birth defects

One study investigated the effects of ambient air pollution on birth defects. A significant association between prenatal exposure to CO and cardiac ventricular septal defects, while O3 was associated with an increased risk of aortic artery and valve defects, as well as pulmonary artery and valve defects.

Adverse respiratory health outcomes

Exposure to ambient levels of air pollutants has been associated with several acute and chronic adverse respiratory health effects in both asthmatic and nonasthmatic children, although asthmatic children have been shown to be more susceptible to the adverse health effects of ambient air pollution. Several studies have linked ambient air pollution to an increased prevalence of asthma, as well as an increased incidence and prevalence of childhood asthma, particularly among children who regularly engage in sporting activities and those with increased asthma medication use, increased asthma emergency department visits and increased hospitalization due to asthma. Current levels of ambient air pollutants may cause deficits in lung function growth in children. Ambient air pollution has been associated with increased reporting of respiratory symptoms among nonasthmatic children, as well as increased respiratory hospital admissions and emergency department visits for children.

School absenteeism

Day-to-day changes in the levels of criteria air pollutants (PM_{10}, SO_2, NO_2 and O_3) have been associated with illness related absenteeism, while short-term changes in O_3 and SO_2 have been linked to respiratory illness related elementary school absenteeism.

Altered immunity

Exposure to ambient levels of criteria air pollutants has been shown to cause alteration in the immune system in children. Ambient air pollution may alter both cellular and humoral immunity in children. Emerging evidence from animal toxicological studies suggest that ambient air pollution may cause suppression of host immunity.

Increased risk of vitamin D-deficiency

In the tropics, children who live in regions with higher levels of ambient air pollution have been shown to be at increased risk of developing vitamin D-deficiency rickets compared with those

residing in less polluted areas. The amount of solar radiation in the ultraviolet B range reaching ground level has been found to be inversely related to the level of ambient air pollution (haze). Ultraviolet B radiation emitted by the sun is required for the conversion of 7-dehydrocholesterol to cholecalciferol (vitamin D_3).

Air pollution: WHO report identifies ways to mitigate health hazards[12]

WHO highlights the need to reduce the emission of black carbon, methane, ozone and carbon dioxide responsible air pollution. The first three are known as Short-Lived Climate Pollutants (SLCPs). SLCPs not only add to global warming, but also cause around 7 million premature deaths yearly because of poor air quality. Six major sectors are the major sources of SLCP emissions and mitigation measures associate with each of these sectors. The sectors are transport, agriculture, household energy production and built environment, industry, energy supply and electricity generation and waste management.

Sector and Mitigation Action	Main Health Benefits
Transport	
Support active (and rapid mass) transport	Improved air quality
	Less crop damage and extreme weather
	Increased physical activity
	Reduced noise pollution
	Reduced traffic injuries
Ultra-low sulfur diesel with diesel particle filter	Improved air quality
	Less crop damage and extreme weather
Higher vehicle emissions standards	Improved air quality
	Less crop damage and extreme weather
Agriculture	
Alternate wet & dry rice irrigation	Less crop damage and extreme weather
	Reduced vector-borne diseases
Improved manure management	Reduced zoonotic diseases
	Improved indoor air quality
Reduce open burning of agriculture fields	Improved air quality
	Less crop damage and extreme weather
Reducing food waste	Less crop damage and extreme weather
	Reduced food insecurity
Household air pollution & building design	
Low emission stoves	Improved air quality
	Less crop damage and extreme weather
	Fewer burns
Improved lighting to replace kerosene lamps	Improved air quality
	Less crop damage and extreme weather
	Fewer burns
	Fewer poisonings
Passive design principles	Improved indoor air quality
	Thermal regulation

Energy supply and electricity	
Shift from fossil fuels to renewables	Improved air quality
	Less crop damage and extreme weather
	Fewer occupational injuries
Replacement of small-scale diesel generators	Improved indoor air quality
	Reduced noise pollution
	Less crop damage and extreme weather
Control on emission from fossil fuel industry	Improved air quality
	Less crop damage and extreme weather
Industry	
Improved brick kilns	Improved air quality
	Less crop damage and extreme weather
Improved cook ovens	Improved air quality
	Less crop damage and extreme weather
Control on emission from fossil fuel industry	Improved air quality
	Less crop damage and extreme weather
Waste Management	
Landfill gas recovery	Improved air quality
	Less crop damage and extreme weather
Improved wastewater treatment	Improved air quality
	Less crop damage and extreme weather
	Reduced infectious disease risk

From: Nasim U. Air pollution: WHO report identifies ways to mitigate health hazards. Down toEarth. https://www.downtoearth.org.in/news/climate-change/air-pollution-who-report-identifies-ways-to-mitigate-health-hazards-51612.

Following are the ways suggested to check pollution and associated health risks:

1. Reducing vehicle emissions by implementing higher emissions and efficiency standards could reduce black carbon and other co-pollutants from fossil fuels, improve air quality and reduce the disease burden attributable to outdoor air pollution.
2. Policies and investments that prioritize dedicated rapid transit such as buses and trains and foster safe pedestrian and cycle networks can promote multiple benefits, including: safer active travel and reduced health risks from air and noise pollution, physical inactivity, and road traffic injuries.
3. Providing cleaner and more efficient stove and fuel alternatives to the approximately 2.8 billion low-income households worldwide dependent on primarily wood, dung and other solids fuels for heating and cooking, could reduce air pollution related diseases and reduce the health risks and time invested in fuel-gathering.
4. Encouraging high and middle-income populations to increase their consumption of nutritious plant-based foods could reduce heart disease and some cancers, and slow methane emissions associated with some animal-source foods.

National clean air programme (NCAP) - India[13]

Government of India to address the issue has undertaken many steps which include notification of National Ambient Air Quality Standards and sector specific emission and effluent standards for industries; setting up of monitoring network for assessment of ambient air quality; introduction of cleaner gaseous fuels like CNG, LPG etc and ethanol blending; launching of National Air Quality Index (AQI); universalization of BSIV for vehicles by 2017; leapfrogging

from BS-IV to BS-VI standards for vehicles by 1April, 2020; banning of burning of biomass; promotion of public transport network; Pollution Under Control Certificate; issuance of directions under Air (Prevention and Control of Pollution) Act, 1981; installation of on-line continuous (24x7) monitoring devices by 17 highly polluting industrial sectors; ban on bursting of sound emitting crackers between 10 PM to 6 AM; notification of graded response action plan for Delhi and NCR identifying source wise actions for various levels of air pollution, etc.

However these are not sufficient and higher level of focused time bound initiatives at both city and rural level are obligatory to address the issue in comprehensive manner at national level. It is in this context, the need for a National Clean Air Programme (NCAP)-India as national level strategy for reduction in air pollution levels at both regional and urban levels is felt. The goal of NCAP is to meet the prescribed annual average ambient air quality standards at all locations in the country in a stipulated timeframe.

Government initiatives[13]

1) National Air Quality Monitoring Programme (NAMP)

Government is executing a nation-wide programme of ambient air quality monitoring known as NAMP. Under NAMP, four air pollutants viz. Sulphur Dioxide (S02), Oxides of Nitrogen as N02, Suspended Particulate Matter (PM10) and Fine Particulate Matter (PM2.5) have been identified for regular monitoring at all the locations.

2) National Ambient Air Quality Standards (NAAQS)

It refers to the condition or quality of air surrounding us in the outdoors. Major objectives of NAAQS are to indicate necessary air quality levels and appropriate margins required to ensure the protection of vegetation, health and property, and to provide a uniform yardstick for assessment of air quality at the national level

3) National Air Quality index (AQI)

The AQI was launched by the Prime Minister in April, 2015 starting with 14 cities and now has been extended to 57 cities. AQI is a tool for effective communication of air quality status to people in terms, which are easy to understand. There are six AQI categories, namely Good, Satisfactory, Moderately polluted, Poor, Very Poor, and Severe. Each of these categories is decided based on ambient concentration values of air pollutants and their likely health impacts.

4) Forty-two Action Point

Central Pollution Control Board (CPCB) has issued a comprehensive set of directions under section 18 (1) (b) of Air (Prevention and Control of Pollution) Act, 1986for implementation of 42 measures to mitigate air pollution in major cities including Delhi and NCR comprising of action points to counter air pollution which include control and mitigation measures related to vehicular emissions, re-suspension of road dust and other fugitive emissions, bio-mass/ municipal solid waste burning, industrial pollution, construction and demolition activities, and other general steps. Directions containing 42 action point which was issued initially for implementation in NCR was subsequently extended to State Boards for implementation in other non-attainment cities.

5) Environment Pollution (Prevention and Control) Authority (EPCA)

Environment Pollution (Prevention and Control) Authority (EPCA) was constituted under Section 3(3) of Environment (Protection) Act, 1986 in 1998 in pursuance of Hon'ble Supreme Court Order to look into the matter pertaining to environmental pollution in National Capital Region (NCR)

6) Impetus on Vehicular Pollution

Vehicles have been identified as major source of pollution. So there is greater emphasis on regulation of vehicular pollution. In this regard Bharat Stage IV (BS-IV) norms has been launched for mandatory implementation since 1 April 2017 and leap-fogging to BS-VI by 1sl April, 2020 has been proposed. Bharat stage emission standards (BSES) are emission standards instituted by the Government of India to regulate the output of air pollutants from internal combustion engines and spark-ignition engines equipment, including motor vehicles. The standards and the timeline for implementation are set by the CPCB of the Ministry of Environment & Forestsand climate change. The standards, based on European regulations were first introduced in 2000. Progressively stringent norms have been rolled out since then. All new vehicles manufactured after the implementation of the norms have to be compliant with the regulations. Since October 2010, Bharat Stage (BS)III norms have been enforced across the country. In 13 major cities, Bharat Stage IV emission norms have been in place since April 2010 and will be enforced for whole country from April 2017.

Reducing personal exposure to ambient air pollution[14]

Staying indoors

Personal exposure to ambient

air pollutants occurs in both indoor and outdoor environments, and the levels of exposure depend on the fractions of time an individual spends in various indoor and outdoor environments, as well as the concentrations of outdoor-source air pollutants in those indoor and outdoor environments.Ambient air pollutants such as particulate matter, ozone, and other gases infiltrate indoors from outdoors, concentrations are generally lower indoors compared to outdoors, and spending time indoors generally reduces exposure to ambient air pollutants. Indeed, environmental protection agencies in a number of countries advise members of the public to remain indoors as part of guidance to reduce exposure and thus acute health risk on high air pollution days.

Cleaning indoor air

Portable or central air cleaning systems can reduce concentrations of indoor air pollutants, of outdoor and indoor origin. Indoor particles with diameters 0.3-0.5 μm were effectively removed by either placing a 5-inch pleated media filter (model BAYFTAH26M, Trane Residential Systems) or an electrostatic air cleaner in the ventilation duct. The application of the 5-inch pleated media filter reduced the indoor/outdoor (I/O) ratio of 0.3-0.5 μm particles 0.8 to 0.2 (75% decrease, 95% CI: 74-76%), and the electrostatic air cleaner reduced the I/O ratio from 0.8 to 0.05 (a 94% decrease, 95% CI: 93-95%) under typical indoor settings specified.Studies further observed that PM2.5 can also be removed effectively by 1inch and 5inch pleated media filters (model BAYFTAH26M, Trane Residential Systems) in the ventilation duct. Under typical indoor settings, the 1inch and 5inch pleated media filters reduced I/O ratio of PM2.5 from 0.40 to 0.27 (a 32.5% decrease, 95% CI: 29-36%) and from 0.40 to 0.08 (an 80% decrease, 95% CI: 79-81%), respectively (7). Practical considerations that may limit the use of increased filtration include added energy costs, noise, and wear and tear to the ventilation system.

Reducing exposure in microenvironments near sources such as traffic

Individuals can reduce exposure to air pollutants and potential adverse health effects by avoiding regular physical activity alongside high-traffic roadways or near other sources of combustion such as burning of wood, biomass, or other materials. Exposure to traffic pollutants can be a rational consideration in choosing walking, biking, or exercise routes. In general, traffic pollution concentrations fall rapidly at distances from roadways, approaching background within about 500 meters, assuming no other local sources are nearby. Individuals who commute to work in personal vehicles or public transportation receive a substantial portion of their daily dose of air pollution during commuting activities. Pollutants emitted by nearby vehicles are the main source of on-roadway exposure. Most air intake filters in passenger vehicles are relatively low efficiency and air pollutants enter through open windows, leaks in door and window seals, and other openings. Reductions of in-cabin PM exposure of up to 40% with cabin filters have been observed.

Personal respirators

In some urban areas around the world, it is not unusual to observe individuals wearing various types of respirators on urban streets in order to reduce exposure to air pollutants. The ability of a respirator to remove contaminants from inhaled air depends on the contaminant, type of filter or adsorbent material, respirator type and conditions of use. Although, relatively inexpensive respirators with filter material for particulate matter are widely available, no single absorbent, or available combination of adsorbents, can efficiently remove the various gas phase air pollutants that may be encountered. Gaseous pollutants can be removed based on their physicochemical properties, such as reactivity, molecular weight, and volatility. Therefore, the removal mechanism for different gaseous pollutant can be quite different.

Knowing if one is more or less likely to be susceptible[14]

In addition to knowing when and where exposures are, or are likely to be, more intense, individuals can better optimize the balance of personal risks and benefits by knowing if they are more likely than others to be particularly sensitive to harmful effects of different air pollutants. While children and young adults may be highly susceptible to some of the subclinical changes caused by air pollution, clinical events attributable to air pollution, such as myocardial infarction, stroke, or hospitalization for respiratory failure or heart failure, will be much more common in older individuals with advanced underlying disease such as COPD or atherosclerotic plaques. Individuals vary in sensitivity to adverse effects of air pollutants, and more-sensitive individuals are likely to obtain more benefit from efforts to reduce personal exposure.

Pollution control: Need of the hour

Health is an all-pervasive subject, lying not only within the domains of the health

department but with all those involved in human development. Great scholars from Charaka to Hippocrates have stressed the importance of good environment for the health of the individual. Therefore, all those who play a role in modifying the environment in any way, for whatever reason, need to contribute to safeguard people's health by controlling the factors which affect it.Let us make the planet earth liveable.

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Nipah virus is an emerging zoonotic illness which is deadly virus which a very high mortality rate of 70-90%. Symptoms includes: fever and headache within three-14 days of exposure an Incubation period of five to 14 days. The clinical signs are fever, headache, and vomiting, followed by drowsiness, disorientation and mental confusion as well as cough, and breathlessness. Brainstem dysfunction in the form of autonomic disturbances and cranial nerve involvement is a notable clinical feature. The origin of infection is likely to be intake of food contaminated by fruit bats. The cardiac manifestations have not been described in the previous outbreaks of nipah infection.

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Malaria-dengue, dengue-chikungunya, malaria-chikungunya and malaria-dengue-chikungunya are the most common coinfections reported from India and the world.

JAPI

Hypertension causes loss of autoregulation of afferent arterioles which leads to transmission of high systemic blood pressure to the glomeruli resulting in glomerular ischemia and subsequently glomerulosclerosis.

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There is increasing evidence that central aortic BP can act as a marker of cardiovascular (CV) and peripheral vascular disease burden and that central pressures may be able to predict CV events and mortality.

HTNJ

GENERAL

Do not panic from Nipah Virus

VIJAY THAWANI, SHUBHAM RICHARIYA

Nipah virus (NiV) belongs to Paramyxoviridae family of genus Henipavirus. Nipah originated from Sungai Nipah, a village in the Malaysian peninsula where the first epidemic of encephalitis was recorded. Flying foxes were considered to be the reservoir of NiV. In 1999 the first outbreak of encephalitis and respiratory illness occurred among the pig farmers of Malaysia and Singapore where 100 deaths were reported out of the 300 infected patients. [1] The second human outbreak was reported from Bangladesh in 2001, where the strain was identified as NiV but it was genetically different from the virus that caused the outbreak in 1999. In the same year in adjoining area in India, at Siliguri human to human transmission of NiV was reported which was nosocomial[1]. Since then NiV outbreaks have been occurring almost annually in Bangladesh and have been also reported several times in India.

India is currently grappling with a fresh epidemic caused by the NiV. The virus has so far claimed 14 lives in Kerala, including four from a single family and an attending nurse who succumbed to it while treating the patients. The outbreak has been limited to Kozhikode and Malappuram districts in north Kerala so far. The virus has so far no vaccine or effective treatment.

What is NIPAH virus infection?

The NiV is a viral infectious zoonotic disease affecting animals and humans. It was first identified in fruit bats of the Pteropodidae family, which are the natural hosts of the virus. It first appeared in domestic pigs in Malaysia and Singapore in 1998-99[2]. The disease causes respiratory and occasionally nervous signs. It has devastating zoonotic potential[3]. There is evidence of NiV infection among several species of domestic animals including cats, dogs, goats, sheep and horses. The NiV has primarily affected humans in various locations worldwide. Out of an estimated 582 human cases of NiV, 54% were fatal[4].

Signs and symptoms

The symptoms start within 3 to 14 days after the exposure of NiV. Initial symptoms are fever, headache, drowsiness followed by disorientation and mental confusion. These can progress to coma in 24 to 48 hours. Encephalitis is the dreaded complication of NiV infection. Respiratory illness can also be present during the early part of the illness. The NiV patients having breathing difficulty are more likely than those without respiratory illness to transmit the virus[5].

Illness with NiV begins with fever and headache followed by inflammation of the brain (encephalitis), drowsiness and disorientation which are characterized by mental confusion. About half of cases also experience respiratory symptoms early on. These signs and symptoms can progress to coma within 24 to 48 hours. Forty percent of the hospitalized cases have mortality. Serious nervous disease with NiV encephalitis has been shown to cause long term illness in some patients that survive, including persistent convulsions and personality changes[6].

Though NiV was well established to have effects on the nervous system, involvement of other organs was relative. In the Malaysian series, respiratory involvement was described in 14 to 29% of cases, although it was unclear if this was part of initial presentation or it was secondary to aspiration or ventilator associated pneumonia. In Singapore, 2 out of the 11 patients had only respiratory symptoms and no encephalitis, while the remaining patients had encephalitis. Cases in Bangladesh and India had higher rates of respiratory involvement, comprising half to two thirds of cases, with some of them developing acute respiratory distress syndrome. This difference may be related to differences between the two strains[7].

Epidemiology

Till now NiV has infected 477 people and killed 252 since 1998. The distribution of NiV outbreaks in Bangladesh and India during 2001 to 2008. Outbreaks of Nipah in south Asia have shown a seasonal pattern and thankfully a limited geographical range[8].

Host

Primary reservoir for NiV is fruit bat of the genus petrous, domestic swine being extremely susceptible to NiV infection acts as amplifying host and Infections have also been reported in dogs, cats, horses and goats[9].

Agent

The NiV is a member of the paramyxoviridae family, is a zoonotic virus, which means it can

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transfer from animals to people. Hendra virus and Nipah virus are members of a newly recognized genus called Henipavirus, within the family paramyxoviridae. Outbreaks of a previously unrecognized paramyxovirus, at first called equine morbillivirus, later named Hendra virus, occurred in horses in Australia in 1994 and 1995. During 1998-1999 an outbreak of illness caused by a similar but distinct virus, now known as NiV, occurred in Malaysia and Singapore. Human illness, characterized by fever, severe headache, myalgia and signs of encephalitis occurred in individuals in close contact with pigs (i. e. pig farmers and abattoir workers). A few patients developed respiratory disease. Approximately 40% of patients with encephalitis died. Recently, cases of NiV virus infection were described in Bangladesh, apparently the result of close contact with infected fruit bats without an intermediate host[10].

Mortality Due to NiV

The emergence of NiV into the pig population and subsequently to the human population is believed to be due to changes in ecological conditions. Urbanization, deforestation and drought resulting in a shortage of resources for bat populations could have compelled bats to move from their natural habitats to agricultural areas. Among the factors that contributed to the disease emergence in Malaysia is the establishment of pig farms within the range of natural host that led to the initial introduction into the pig population; the maintenance of high densities of pigs led to the rapid dissemination of the infection within local pig populations; and the transport of pigs to other geographic areas for commerce led to the rapid spread of disease in pigs in southern Malaysia and Singapore. The presence of high density, amplifying host population facilitated transmission of the virus to human[11].

Ninety-four patients with NiV infection were seen from February to June 1999. Ninety-three percent of them had direct contact with pigs, usually in the two weeks before the onset of illness, suggesting that there was direct viral transmission from pigs to humans and a short incubation period. The main presenting features were fever, headache, dizziness, and vomiting. Fifty-two patients (55%) had a reduced level of consciousness and prominent brain-stem dysfunction. Distinctive clinical signs included segmental myoclonus, areflexia and hypotonia, hypertension, and tachycardia suggesting the involvement of the brain stem and the upper cervical spinal cord. The initial cerebrospinal fluid findings were abnormal in 75% of patients. Antibodies against Hendra virus were detected in serum or CSF in 76% of 83 patients tested. Thirty patients (32%) died after rapid deterioration in their condition. An abnormal doll's-eye reflex and tachycardia were factors associated with a poor prognosis. Death was probably due to severe brain-stem involvement. Neurological relapse occurred after initially mild disease in three patients. Fifty patients (53%) recovered fully, and fourteen (15%) had persistent neurologic deficits[9].

What is the Treatment of NiV?

Treatment is limited to supportive care. Because NiV encephalitis can be transmitted from person-to-person, standard infection control practices and proper barrier nursing techniques are important in preventing hospital-acquired infections. The drug ribavirin has been shown to be effective against the viruses in vitro, but human investigations so far have been inconclusive and the clinical usefulness of ribavirin remains uncertain. Passive immunization using a human monoclonal antibody targeting the Nipah G glycoprotein has been evaluated in the post-exposure therapy in the ferret model and found to be of benefit[12].

Future ahead

Fortunately the NiV infection is episodic and occurs in a localized geographical area at one time. The infection is self limiting and does not spread like fire. However the epidemiology exists and the morbidity and mortality are a cause of concern. Thus the NiV keeps returning back after few years to affect the humans and animals. No successful vaccine has been so far developed against NiV, however WHO efforts are going on. Remains to be seen if mankind will win over NiV and when? Till then there is no need to panic. State Governments have in the meantime have issued the health advisories. The local populations are advised to follow these meticulously.

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CASE REPORT

Hereditatry angioedema - an unusual cause of abdominal pain

MAYANK JAIN

An eleven year old boy presented with history of episodic abdominal pain for 2years. He reported three discrete episodes during which he experienced moderately severe, diffuse abdominal pain with no aggravating or relieving factors. Each episode lasted for 4-5 days and responded to over the counter drugs. His parents reported that during the first episode, he had swelling over his hands and feet, and during the second episode, swelling over his penis was noted. An ultrasound done during the second episode had shown right sided colonic thickening which was managed with a course of antibiotics. During the third episode, he had developed swelling over the eyes and lips. On examination, his vitals were stable and subcutaneous edema over the periorbital region (left > right), lips, hands and feet was noted.(Image 1a and b) There was no rash or respiratory distress.No family history of similar complaints was noted. Possibilities of non immunologic angioedema, hereditary or idiopathic angioedema were considered.Complete blood counts, renal and liver biochemical tests and ultrasound abdomen were normal. Serum IgE levels and absolute eosinophil counts were normal. Low levels of C1 esterase inhibitor levels (12 mg/dl, normal 21-39 mg/dl) and C4 levels (8mg/dl, normal > 14) were noted.

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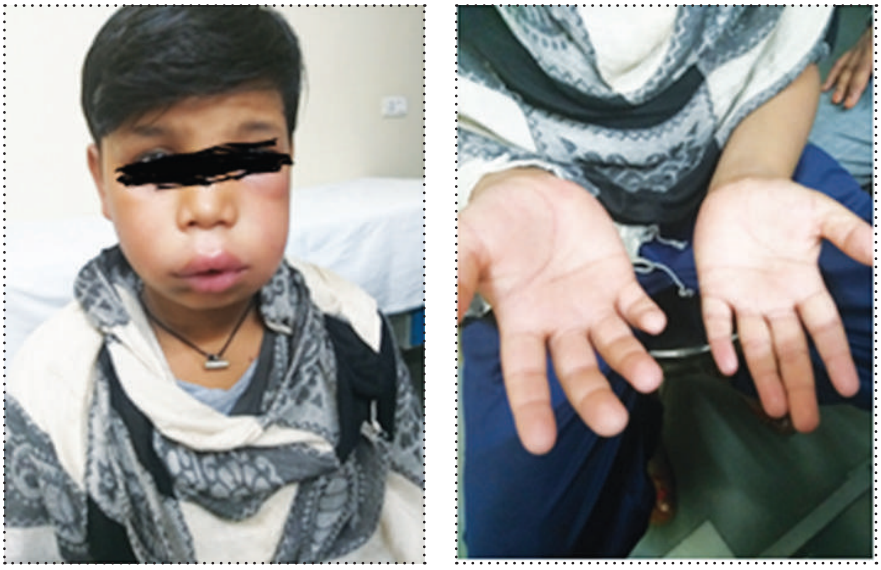

Figure 1- a) periorbitaledema and swelling in the upper lip b) swelling in both hands (right >left)

Thus, a diagnosis of hereditary angioedema type 1 was made. He has been started on danazol 600mg per day to prevent further attacks. Diagnosis of this rare condition is important as it does not respond to corticosteroids, adrenaline and antihistaminics. The treatment is largely supportive and airway maintenance is of utmost importance.

Hereditary angioedema (HAE) was first described by William Osler[1]. It affects 1 in 50000 people and is first noted in childhood.[2] There are three main types of HAE. Type I and II are caused by a mutation in theSERPING1 gene that makes the C1 inhibitor protein while type III is often due to a mutation of the factor XII gene.[2] This results in increased amounts of bradykinin which promotes swelling.[2]

Management involves efforts to prevent attacks and the treatment of acute attacks. During an acute attack, supportive care like intravenous fluids and airway support.[3] Ecallantide and icatibantcan be used to treat acute attacks.[3] For prevention of recurrent laryngeal edema, danazol, stanazol or tranexemic acid may be used.

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CASE REPORT

Hepatoid adenocarcinoma of the stomach with neuroendocrine differentiation – A case Report

AFREEN KARIMKHAN, ASHWINI NARGUND, GNANAPRIYA V., MARJORIE CORREA, JULIAN CRASTA

ABSTRACT

Hepatoid variant of adenocarcinoma of the stomach is a rare variant of gastric cancer and has an extremely poor prognosis. 45 year old woman was referred to our institution for the evaluation of anemia. On investigations, the CT scan showed diffusely homogenously enhancing circumferential thickening of antrum and pylorus with peripancreatic lymph nodes. After endoscopic biopsy, pathological diagnosis of moderately differentiated adenocarcinoma was made and she underwent D2 subtotal gastrectomy. The histopathology of the tumour showed a poorly differentiated adenocarcinoma of the stomach. On immunohistochemistry, the neoplastic cells expressed CK, CK7. The tumor cells in the metastatic lymph nodes also expressed Hepar-1, synaptophysin, chromogranin with cytoplasmic TTF1 expression. Based on the morphological and immunohistochemical findings final diagnosis of poorly differentiated hepatoid variant of adenocarcinoma with neuroendocrine differentiation was made. This case is rare since the hepatoid adenocarcinoma had neuroendocrine differentiation. Although gastric adenocarcinomas frequently have neuroendocrine differentiation with a prevalence ranging from 1.7% to 34.3%, Hepatoid adenocarcinoma with neuroendocrine differentiation has rarely been described. Our case is an example of the diverse morphological and immunophenotypical differentiation of gastric carcinoma.

Key words *– Gastric hepatoid adenocarcinoma, neuroendocrine differentiation, gastric cancer, prognosis.*

Introduction

Hepatic variant is a rare variant of gastric carcinoma, included in less than 5% of cases of gastric carcinoma, with aggressive behaviour and poor prognosis. It represents the diverse differentiation of gastric carcinoma and highlights the common embryology shared by stomach and liver (foregut derivatives). Here we report a case of 45 year old female, presenting with hepatic variant of adenocarcinoma with neuroendocrine differentiation.

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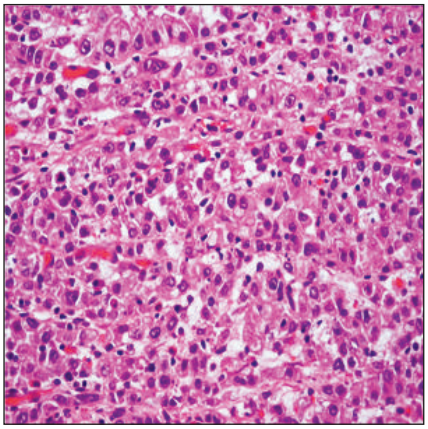
Case Report

A 45-year-old female, known case of hypertension, presented with complaints of generalized weakness since 2-3 months, for which she visited a local hospital. There she was diagnosed with anaemia and received two transfusions of packed cells. Despite that, her symptoms worsened and she started having malaena, 5 episodes since 2-3 days, early satiety and discomfort. She was evaluated in St. John's Medical college. On examination, no other significant finding other than pallor was present.

Lab investigation showed haemoglobin – 6.5g%, total count 7,820/uL, with differential count (Neutrophils- 62%, Lymphocytes – 29%) with normal platelets. Renal function and liver function tests within normal limits. CT scan showed diffusely homogenously enhancing circumferential thickening of antrum and pylorus with peripancreatic lymph nodes. Endoscopic biopsy done, revealed a moderately differentiated adenocarcinoma. After this, the patient underwent D2 subtotal gastrectomy and Rou-en-y reconstruction and feeding jejunostomy. The gross specimen showed an ulcerative lesion along greater curvature with everted margin extending from 4.5 cm from proximal margin to 1 cm before distal margin with a depth of 1.5cm.Microscopy showed section of stomach wall with ulceroinfiltrating neoplasm, with neoplastic cells exhibiting moderate nuclear pleomorphism, high N:C ratio, vesicular nuclei, irregular outline, prominent nucleoli and granular eoisinophillic cytoplasm (Fig 1).



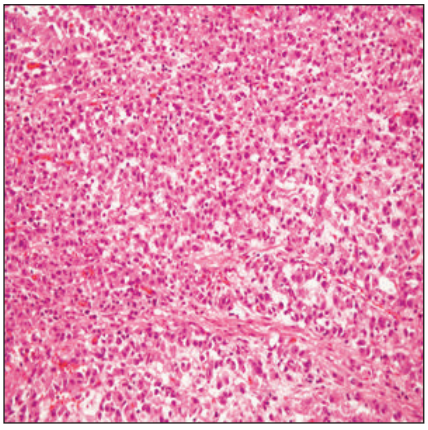
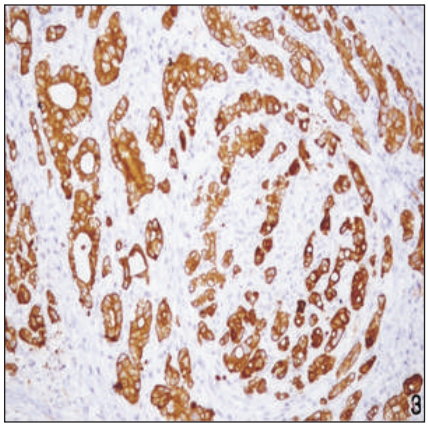


Fig 1 show stomach H& E (40X) showing infiltrating neoplasm

The tumour invades through muscularispropria and into perimuscular connective tissue. The surrounding stroma showed a marked desmoplastic response. On immunohistochemical staining, the neoplastic cells expressed CK7 (Fig 2), CK (Fig 3) and cytoplasmic TTF1 (Fig 4).



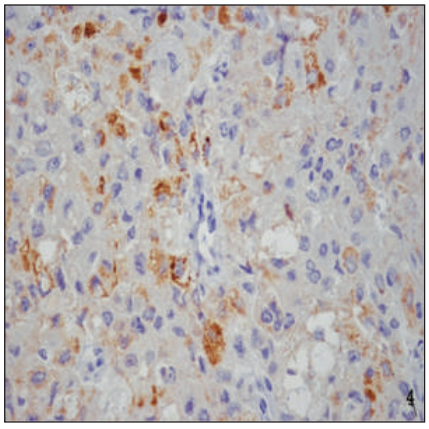


Fig 2, 3 and 4 shows neoplastic cells showing positivity for CK7, CK and TTF1

Lymph nodes showed an area of solid growth of polygonal cells with round, centrally located nuclei and abundant clear to eosinophilic cytoplasm, with diastase resistant PAS positive granules (Fig 5 & 6).

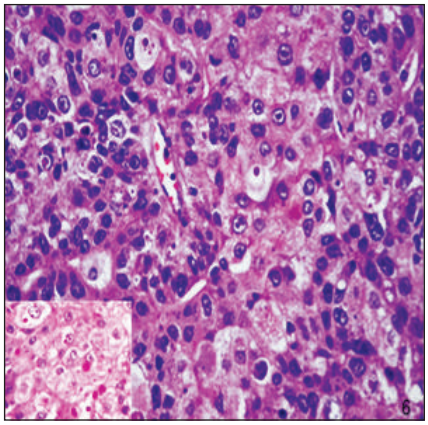
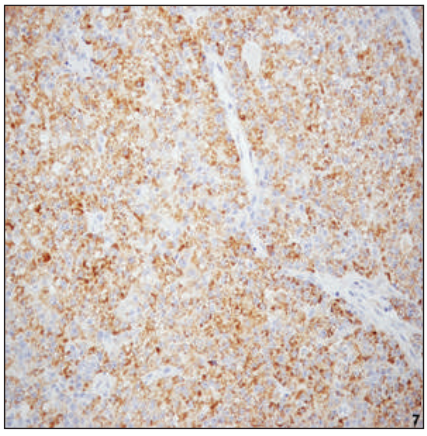
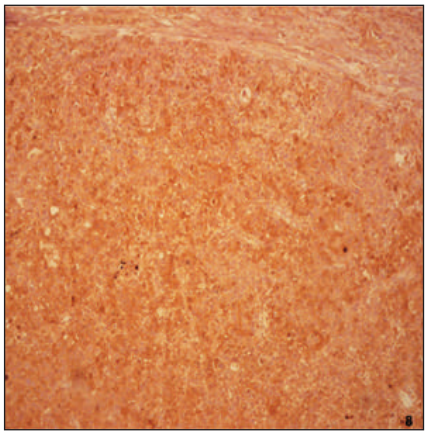


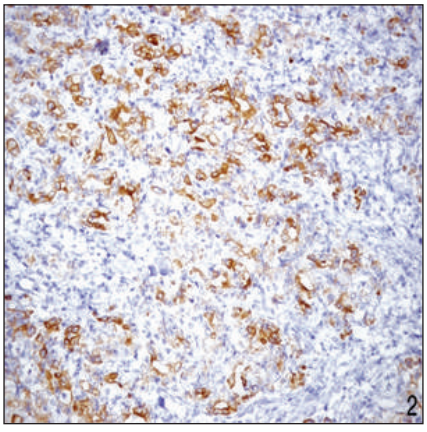
Fig 5 and 6 shows Lymphnode showing Hepatoid differentiation with inset showing PAS positive globules

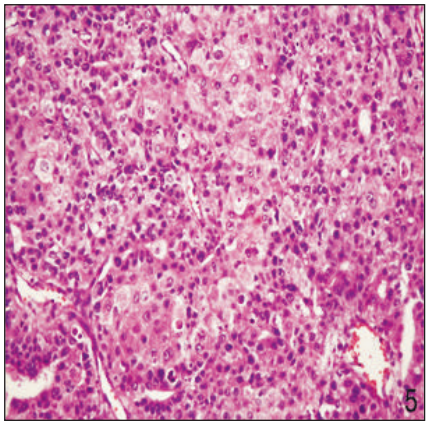
This area is positive for Heppar-1 (Fig 7) and AFP



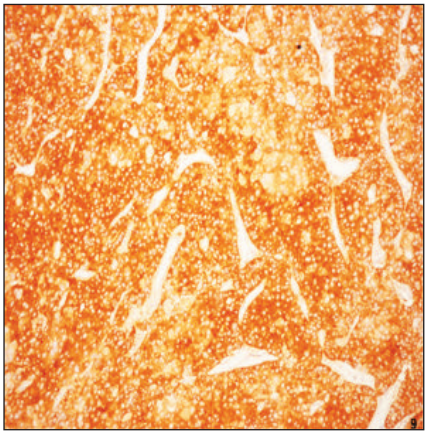


(Fig 8) suggestive of Hepatoid differentiation. Lymph nodes also showed foci of small monotonous cells with stippled chromatin, which





were positive for synaptophysin (Fig 9)and chromogranin (Fig 10). Thus the diagnosis of, poorly differentiated hepatic variant of adenocarcinoma with neuroendocrine differentiation was made.



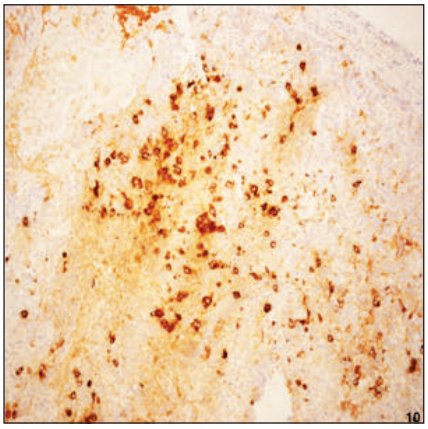


Fig 7 & 8 shows lymphoid cells positive for Heppar-1 and AFP suggestive of Hepatoid differentiation. Fig 9 &10 shows the cells having positivity for synaptophysin and chromogranin.

Discussion

Hepatic adenocarcinoma (HAC) is a rare variant of gastric carcinoma which contains hepatocellular elements. Described by Ishikuraet al in 1980, as gastric carcinoma with raised AFP levels, presently, the definition has been changed to also include tumours without AFP production[1]. Though most common region is stomach, HAC are seen in several different organs, including the lung, pancreas, Oesophagus, Ampulla of Vater, Colon, Urinary bladder, Renal pelvis, Ovaries, Uterus, and Cervix[2]. Baek et al have described the tumour occurring more commonly in males, above 40years with site being lower one-third of stomach particularly antrum[3]. Histologically, hepatoid carcinoma is composed of polygonal cells, with clear and abundant eosinophillic cytoplasm arranged in trabecular fashion. Glycogen stores and PAS positive hyaline globules are seen[4]. The hepatoid originof the cells in such carcinomas is often corroborated by the IHC staining for AFP and recently, Hep par1 antibody.

Hep par 1 antibody has been shown to be sensitive marker of hepatic origin for carcinomas outside the liver[5]. This is further supported by the above case, where focal positivity for hep par 1 is seen in hepatoid cells. The interesting observation in our case was that the hepatoid differentiation was present only in lymph nodes, indicating the metastases was already present at the time of diagnosis, a finding not seen in previous reports. Though, Yang et al, have observed lymph nodes being the most common site for metastases[6]. Aeri Kim has reported gastric Hepatoid adenocarcinoma with neuroendocrine differentiation[7]. But in this case foci of neuroendocrine differentiation was seen in metastatic lymph nodes rather than primary tumour. Okomata et al have reported gastric hepatoid adenocarcinoma with neuroendocrine differentiation and trophoblastic differentiation in lymph node. He hypothesized that this resulted from the dedifferentiation of pre-existing adenocarcinoma or independent development from normal gastric epithelial cells[8]. This holds true in this case also.Nagai et al have reported presence of neuroendocrine markers in areas adjacent to Hepatoid differentiation in 3/21 cases[4].

Presence of hepatoid differentiation signifies a poor prognosis due to increased metastases and immunosuppressive properties of AFP[9]. This report highlights the diverse variations of gastric carcinoma.

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Relation between Marma and Shatchakra

SNEHAL V. BUCHADE, CHHAYA PATIL

Chakras –

According to Tantra Yoga, there are six chakras distributed throughout the body. The main three nadis – ida, Pingala and Sushumna – connect these chakras to the brain.

1. Muladhara Chakra
2. Swadhisthana Chakra
3. Manipura Chakra
4. Anahat Chakra
5. Vishuddha Chakra
6. Ajna Chakra
7. Sahashradhara Chakra

1. Muladhara Chakra –

The Muladhara chakra is also known as the root center. It is situated in the perineum, at the base of the spinal column. This chakra is in correlation to the inferior hypo gastric plexus of nerves, which supplies the region of external genitals. It has in its center, a triangle from which the sushumna begins and which ends at the top of the head. This chakra is related to the primordial element of earth, the sense organ of the nose and has four crimson colored petals. Its beeja(seed) mantra is Lam.

2. Swadhisthana Chakra –

The Swadhisthana Chakra is known as the sex center, as it is situated in between the genitals. This is in close correlation with the upper hypo gastric plexus. This Chakra is related to the primordial element of water, has a white crescent moon in its center, is related to the sense organ of the tongue, and has six petals. Its presiding deity is Vishnu, and its beeja mantra is Vam.

3. Manipura Chakra –

The Manipura chakra is known as the naval center , and is situated at the umbilicus. It is in close association with the colic and solar plexus. The red triangular mandala in its center contains the primordial element of fire. It is related to the sense organ of the eye and has ten petals, which are of a dark purple color. The presiding deity is Rudra and the beeja mantra is Ram.

4. Anahat chakra –

The Anahata chakra is situated in the heart region and hence is known as the heart chakra. It is in correlation with the cardio-pulmonary plexus. It is related to the primordial element of air, the sense organ of the skin and has twelve petals of a deep red color. The beeja mantra is Yam and the presiding deity is Isha.

5. Vishuddha Chakra –

The Vihuddha chakra is situated in the region of the throat, and hence is known as the throat chakra. Within a pure blue circle is the primordial pentad of space, the sense organ of hearing and has sixteen smoky purple petals. The presiding deity is Lord Shiva and the beeja mantra is Ham.

6. Ajna Chakra –

The Adnya Chakra is situated in between the eye-brows and has only 2 petals of a pure white color. This is known as the "third eye" center. Om is the beeja mantra and the presiding deity is Paramashiva. It is in close relation with the hypothalamus, limbic system and the neighbouring region with connection to pituitary gland.

7. Sahashradhara Chakra –

The Sahashradhara Chakra is the brain and it has been described in yogic texts as having a thousand and one petals.

The Chakras & the Endocrine system –

The science of Yoga is one of the science that we find in the treasury of Vedic knowledge. Great sage Patanjali in his 'Yoga Sutras' has explained this science in details. Ayurveda is the science of life or longevity and Yoga is the science of linking the individual self with the Universal self. Both the sciences of Yoga and Ayurveda have evolved from the same philosophy, culture and country.

There are various types of Yoga practices. Hatha Yog, Raja Yoga, Bhakti Yoga, Jhyana Yoga, Mantra Yoga, Dnyana yoga, Karma Yoga etc. Out of these types Hatha Yoga is very much popular.

Hatha Yoga explains that there are series of six subtle centers or chakras which are connected by nadis or channels to different organs in the body. Shiva Samhita explains that there are 3,50,000 nadis out of which 14 are the major channels. The Siddha system is very similar to that of Ayurveda. It seems that this system has amalgamated the principles of Ayurveda and Yoga together. They have accepted 72,000 nerves or nadis, which are connected to different chakras.

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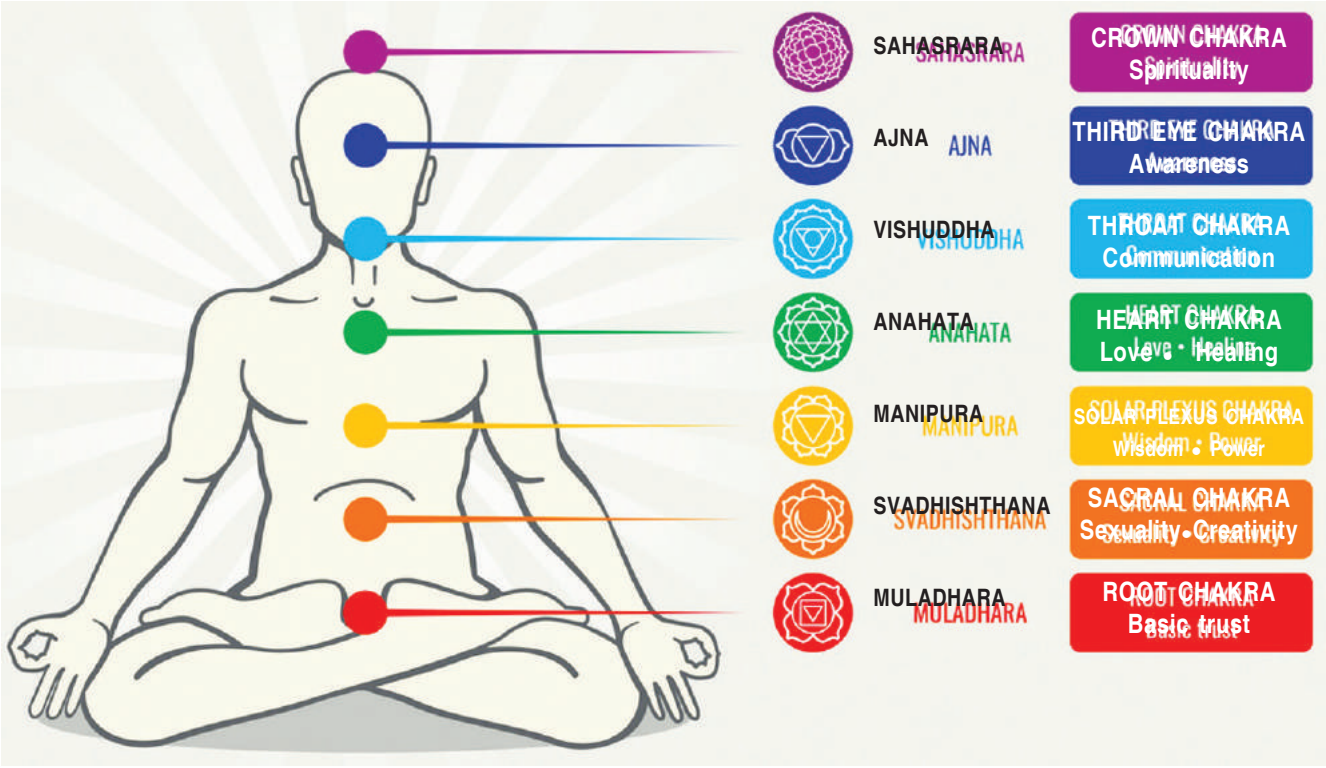

Chakras & Marmas -

S.No.	Name	Plexus & Glands	Marma	Siddha marma
1.	Muladhara Chakra	Sacral, coccygeal plexus, testes	Guda	Kundalini marma
2.	Swadhisthana Chakra	Hypo gastric, lumbar plexus, ovaries, adrenals	Kukundara marma	Vallurumi Varman
3.	Manipura Chakra	Solar, coelic plexus, pancreas	Nabhi & Bruhati marma	Anna Kalam
4.	Anahata Chakra	Cardiac plexus, thymus gland	Hridaya marma	Ner Varman
5.	Vishuddha Chakra	Cervical, carotid, pulmonary plexuses, thyroid, parathyroid	Nila & Manya	Sumai Varman
6.	Ajna Chakra	Cavernous plexus, optic chiasma, thalamus	Sthapani	Thilartha kalam
7.	Sahasradhara Chakra	Brain	Adhipati	Uchi Varman

❖

LAP (lipid accumulation product

LAP was calculated using WC and fasting TG level using the following formula for men and women respectively

LAP = (WC-65) ×TG for men

LAP = (WC-58) ×TG for women

Post Herpetic neuralgia (PHN) is neuropathic pain that occurs after herpes zoster infection

Botulinum toxin significantly decreases the severity of pain in PHN patients and last for 4-6 month of the period.

- Journal of The Association of Physicians of India

Netratarpana

KIRAN B. PATIL

Ayurveda is a science with a very rich legacy which describes various physiotherapeutic procedures in many clinical conditions. Akshi Tarpana is also one such procedure which is widely indicated in many ophthalmic conditions. It is found to be effective on anecdotal and clinical experience grounds. It is the foremost treatment procedure mentioned in Sushruta Samhita for eye disorders. But even then, neither proper acceptance nor precise scientific reasoning for the procedure is established.

There are lots of discrepancies found in the whole process. Drug absorption and mode of action are also big riddles to understand & explain to modern as well as Ayurvedic physicians, so that its acceptance and significance could be understood by the masses.

The word 'Tarpana' is derived from the root 'Trup' by adding the 'Lyut'

Pratyaya. The literary meaning of the Tarpana is to give nourishment of the eye through Ghrita, Ghritamanda, medicated Ghritas, Vasa, Majja (bone marrow) etc.

Indication for Tarpana karma:

'Tamyati ativishushkam Yat ruksham Yacchatidarunam.

Shirnpakshmavilam jivham rogaklishtam ch yadbrusham.

Tadkshitarpanadev labhetorjamsamshayam.'||

(Su. U. 18/17-18)

When a patient sees darkness in front of eyes, in severe dryness of the eyes, much roughness of the eyes, stiffness of the eyelids, falling of eye lashes / Madrosis, dirtiness of the eyes / Altered or lost lusturr of ocular surface, deviated eye ball / Squint.

In extreme aggravation of the diseases of the eye.

Vagbhatta has further added a list of disease specifically selected for Tarpana.They are Kricchronmilana, Siraharsha, Sirotpata, Arjuna, Shukra, Timir, Abhishyanda, Adhimantha, Anyatovata, Vataparyaya and inflammatory conditions of the eyes Vatika and Paitika diseases of eyes as well as injured eyes due to Abhighata.

Contraindications for Tarpana karma:

Durdina atiushna shiteshu chintaya sabhrameshu ch

Ashanto updrave chakshni tarpanam na prashsyate||

(Su. U. 18/18

According to Acharya Sushruta, the various conditions where Tarpana is contraindicated are given below:

1. Cloudy day.
2. Excessive hot and cold season.
3. Worry and Anxiety – Mental state
4. In Exhaustion, Giddiness – Physical health state
5. In the condition of acute pain etc. - complication of ocular disease.

Procedure:

The patient is asked to lie down on his back, in a chamber free from direct sun rays, wind and dust, and is given mild fomentation with a cotton soaked in lukewarm water, then the eyes are encircled with firm, compact leak proof wall made up of paste of powdered Masha pulse (black gram). The patient is asked to close the eyes and over the closed eyes, liquefied Ghrita is poured very slowly till the entire eyelashes are under the liquefied Ghrita. Patient is instructed to close and open his / her eyes (Unmesha & Nimesha). After retaining for the stipulated time, the Ghrita is drained out through the hole made near the outer canthus and the eye is irrigated by lukewarm water fomentation (Su. U.18/6-10).

Pashchat karma:

After finishing the main procedure of Akshitarpana, Dhoompana i.e. medicated smoke is given to the patient. Then patient is advised to avoid direct exposure to excessive cold, heat, wind, lustrous & shiny things.

Course of procedure:

Ekaham va trahyamva api panchaham cheshyate param | (Su.U. 18/12)

Sushruta, without clarifying the condition of the eye, simply asks to perform the procedure for one day, three days and five days or till the proper satiating features are attained.

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Dalhana in his commentary quotes the view of Gayadasa, Jejjata and Videha. According to Gayadasa, this duration is given in accordance to Vatika, Paittika and Shlaishmika eye disease respectively.

According to Jejjata, the duration of treatment in mild, moderate and severely aggravated Doshas is of one, three and five days respectively.

Videha says that the procedure should be carried out daily in Vatika diseases, alternatively in Paittika and Raktaja diseases, with interruption of two days in healthy eye and Sannipataja disease and with the interruption of three days in Kapha diseases.

Vagbhatta is in agreement with Videha, except for Kapha diseases where he advises an interruption of two days.

Period of retention:

Tarpana should be retained for a period, which is taken for counting the number of syllables mentioned according to the healthiness or unhealthiness of the eye.

Signs and symptoms of proper Tarpana:

Sukha swapna avbodhatvam veshyadam varnshatvam

Nivruti vyadhividhwans: kriya laghavmevch ||

(Su. U. 18/13)

The features of properly conducted Tarpana i.e. sound sleep, Blissful awakening, cessation of secretion, clearness of vision, discernment of individual colours, agreeable sensation, lightness of the eye and proper functioning of eye, ability of the eye to tolerate Sunlight.

Complications of excessive Tarpana:

Gurvavilam atisnigdham ashru kandupdehavat

Deyam dosh samutklistam netram atitarpitam ||

(Su. U. 18/14)

Features of heaviness, indistinct vision, excessive oiliness, lacrimation, itching, stickiness and aggravation of Doshas especially Kapha Dosha results from excessive Tarpana.

Effect of inadequate Tarpana:

Ruksham avilamstradhyam saham rupdarshane

Vyadhivrudhichya tat dnyeyam hin tarpitam akshich

(Su. U. 18/15)

Dryness, indistinct vision, excessive lacrimation, intolerance to light and aggravation of the disease are the features of insufficient Tarpana.

Treatment of inadequate and excessive Tarpana:

Anayo: dosh bahulyat prayatet chikisitye

Dhum nasya anjane seke : rukshe : snigdhech ya yogvit || (Su. U. 18/16)

In these two conditions, treatment will be applied according to predominance of Doshas with Dhoompana, Nasya, Anjana and Seka either Snigdha or Ruksha are to be used for them. Snigdha in diseases of Vata, Ruksha in Kapha and Sheeta in Pitta.

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Essential hypertension accounts for >90% of cases of hypertension. The pathogenesis of essential hypertension is multifactorial, with involvement of multiple pathophysiologic factors. THESE include increased sympathetic nervous system activity, activity of the rennin-angiotensin-aldosterone system, and vascular tone due to inappropriate levels of vasoconstrictors, vasodilators and alterations in adrenergic receptors; inadequate dietary intake of potassium and calcium; diabetes mellitus and insulin resistance and altered cellular ion transport.

In addition to these dietary sodium, or salt, intake has been found to play a key player, and the most common and important risk factor for hypertension.

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Obstructive sleep apnea (OSA) is a chronic condition in which there is repetitive partial or complete collapse of pharynx during sleep. OSA is the most common sleep-related breathing disorder and is increasingly being recognized as an important risk factor in cardiovascular diseases.

HTNJ

Female Fertility – Ayurvedic Cencepts

TINKU GANESH KHALACHE, YOGITA DHERE, JYOTI BANDEWAR

ABSTRACT

Fertility is the natural capability to produce offspring. Human fertility depends on factors of nutrition, sexualbehavior, consanguinity, culture, instinct, endocrinology timing, economics, way of life, and emotions. Infertility is defined as a failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse. Reasons such as weight, diet, smoking, medical conditions, other substance abuse, environmental pollutants, medications and family medical history, infections might have an effect on conception in couples.

Keywords: *Ayurveda, Infertility, Diet, Herbs.*

• Ayurvedic interpretation of the female reproductive system

Ayurveda identifies the female reproductive systems as follows:

1. Shroni‟ means the pelvis
2. There are three Srotas (also called capillaries) in women‟s body –

Rajovaha srotas -

Includes uterus, cervix and vagina along with their blood supply.

Artavaha srotas -

Includes ovary and fallopian tube along with their blood supply

Stanyavaha srotas -

Includes breast tissue along with its blood supply

Yoni consists of all the female genital organs.

• Infertility- Ayurvedic view

The key foundations of health are-

1. Universal interconnectedness (relationship among people, their health and the universe)
2. Prakriti (person‟s unique combination of physical and psychological characteristics and the way the body functions to maintain health), and
3. Doshas (life force- that control the activities of the body).

Infertility primarily refers to the biological inability of a woman of reproductive age to contribute to conception & also the state of a woman who is unable to carry pregnancy to full term. Ojas is the essence of all of the bodily tissues and directly influencing physical, emotional, mental, and spiritual life of a person. If Ojas is low, perfect and positive health is impossible – it is difficult for a person to let go off disease, or attain the higher states of bliss and consciousness.

Ayurveda states that, conception is the result of healthy sperm, healthy ovum, and a healthy uterus. Reproductive health of both men and women depends on the health of the Shukra Dhatu, (reproductive tissue)

• Types of infertility

1. Vandhya -

Absolute sterility and incurable

2. Apraja -

Women can become pregnant and curable

3. Sapraja -

Women who is inflicted with infertility during her reproductive years after already conceiving one or more children

Menstrual cycle (an indication of the state of the health of the female) can be affected by many factors, such as diet, emotional instability, excessive physical exercise, life - style and stress is responsible for creating an imbalance of the Doshas. The most easily disturbed Dosha is the Vata which causes functional defects in the egg, difficulties with implantation and is often responsible for infertility. However, infertility rarely involves only one Dosha.

• Symptoms and Dosha Co-relations

1. Vata Dosha

a. Excessive flow

b. Vaginal dryness

c. Cervical dryness

2. Pitta Dosha

a. Excessive bleeding

b. Inflammation, pain & burning sensation in uterus

c. Ulcers in genital tract.

3. Kapha Dosha

a. White discharge per vaginum

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b. Thickening of uterine lining.

• Diet management

Diet plays a crucial and vital role in the prevention and cure of diseases and in maintenance of good health. As per Ayurveda there are three qualities of mind (guna) i.e., Satva, Rajo and Tamo guna. Food affects the mind by causing either an increase or decrease in these qualities of mind. Eating whole foods provides all nutrients for the health of the body in addition to fiber that influences hormonal levels. This is important to regulates ovulation and enhance fertilization. Foods such as processed carbohydrates, excess starch, antibiotic and hormone laden meat, milk and canned foods destroy fertility. Ojas building food includes milk, ghee, nuts, sesame seeds, dates, pumpkin seeds, honey, saffron and avocados. Fresh, organic fruits and vegetables, protein from plant sources like beans and peas, whole grains, juicy fruits such as mangoes, peaches, plums and pears, asparagus, broccoli. Spices such as ajwain powder, turmeric, cumin and black cumin boost fertility.

• Herbs

The most commonly known and used herbs such as Ashwagandha (Withania Somnifera), Shatavari (Asparagus Racemousus), Amlaki (Emblica Officinalis) are extremely useful which help create the synergistic hormonal balance between the Follicle Stimulating Hormone (FSH) and the Luteinizing Hormone (LH). As infertility is not a disease by itself but a manifestation of some disease, the herbs used in the treatment are directed towards eradicating the underlying cause

Herbs as per Dosha

1. Vata Dosha

a. Shilajit –

Purifies the reproductive system.

b. Shatavari, Vidari Kanda –

Reproductive tonics

2. Pitta Dosha

a. Shatavari, Vidari Kanda, wild yam –

Cooling effect, Reproductive tonics

b. Bramhi –

Calms mind

c. Bala –

Douche used for normalizing vaginal pH.

3. Kapha Dosha

a. Guggulu –

Clears obstruction

b. Turmeric, Manjistha –

Supports clearing obstruction.

4. Tridoshas (Involving all three dosha)

a. Phalaghrit

b. Vanga Bhasma

• Conclusion

Infertility has increased tremendously in the past decade and this is due to the result of a combination of social, environmental, psychological, and nutritional factors. Ayurveda addresses the internal balances and external influences contributing to the problem by building the Ojas, improving the overall health of the individual, stimulating the hypothalamus and pituitary glands thereby indirectly inducing the ovaries to ripen and release eggs. Ayurveda provides a noninvasive, low cost and non-iatrogenic alternative and complement to modern western medicine in the treatment of female infertility. Although a number of treatments are available to treat infertility, their large costs to make it important to consider alternative approaches.

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OSA includes repetitive hypopneas, cyclical apneas, excessive hypoventilation, or a combination of these induced through pharyngeal collapse to the point of ventilator constraint. During sleep, it is a physiological phenomenon to have reduced tonic activation of upper airway dilator musculature, leading to increased airway compliance and an enhanced collapsibility. However, OSA patients have more susceptible and collapsible airways.

Pathogenesis of OSA is thought to be a complex interaction of unfavorable pharyngeal anatomical compromise, upper airway dilator muscle dysfunction, reduced end expiratory lung volume, and upper airway edema. There are multiple upper airway dilator muscles, the largest being the genioglossus. These muscles receive input from the respiratory pattern generating neurons, chemoreceptors, and negative pressure receptors in the airway. Patients with highly compromised upper airways tend to develop complete obstruction, leading to apnea. Accumulation of arterial carbon dioxide during apnea will trigger ventilator efforts and transient cortical arousal.

HTNJ

Role of Ayurveda in the management of Vyanga w.s.r.to Melasma

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Abstract

Vyanga is kshudraroga characterized by the presence of Niruja (painless), shyavavarni mandalas (bluish black patches) on face. On the basis of clinical features, it can be compared with facial melanosis, one of the hyper pigmented disorder. Drugs with raktaprasadaka,twakaprasadaka and varnyakar properties are helpful in the management of vyanga, that pacifies aggregated doshas & help in raktashodhan (blood purification).

Keywords: *Vyanga, Kshudraroga, Melasma, Pigmentary disorder, Ayurvedic Treatment.*

Introduction

Melasma is common acquired condition of symmetrical reticulated hyper pigmentation patches typically occurring on face with higher prevalence in female & darker skin type. Multiple etiological factor including sun exposure, hormonal influences, genetic factors, drugs such as phenytoin and cosmetics have been implicated in pathogenesis of this disorder[1]. Various topical, oral & procedural therapies are successfully used to treat melasma.

There are many skin disorder concerned with cosmetic value among which vyanga is common disorder which can be correlated with melasma in modern science.

Acharya Shushruta & Vaghbhat have mentioned it under the concepr of Kshudraroga while Acharya Charaka has explained it as one of the Raktapradoshaja vikara. It has significant impact on appearance causing psychological & emotional distress and reduce quality of life.

Traditional topical therapies including hydroquinone, tretinoin, corticosteroids & triple combination creams & other synthetic topical compounds are also effective on this.

Promising oral therapies include tranexamic acid, polypodium, leucotomos & glutathione.

Procedures include chemical peels, microneedling, radiofrequency & laser treatment for melasma.

Ayurveda mentions massage with oil, application of herbal drug paste, i.e. lepa to make face smooth, soft, glowing which are cost efficient.

Aims and objectives-

1. To search & re-evaluate vyanga in various ayurvedic literature w.s.r.to melasma.
2. To evaluate & elaborate the etiology & pathogenesis of vyanga.
3. To elaborate & discuss management of vyanga w.s.r. to melasma.

Materials & Methods-

The article is based on review of ayurvedic texts and research papers. Material is collected from ayurvedic laghutrayi, bruhatrayi &other ayurvedic books. Modern texts, journals & various websites are searched to collect information.

Conceptual study -

Ayurvedic disease review -

According to ayurveda,vyanga is raktapradoshaj vikara[2]. Aacharya Sushruta & Vagbhata have mentioned it in kshudraroga[3,4]. Main causative factor for vyanga is krodha &ayasa i.e.anger & excessive hardwork[4]. Probable doshas involved are udana vayu & bhrajaka pitta &dushya rasa & rakta dhatu.

Samprapti-

As Acharyas says, prakupit vayu due to anger & hardwork along with pitta dosha in combined form suddenly come to facial region & produce blackish coloured (shyava), thin (tanu) patches on skin[4].

Causative factors-

Mainly anger & excessive hardwork[4].

Samprapti Ghataka-

Dosha-vata, pitta.

Dushya-Rasa, Rakta.

Adhishthana-mukhagat twaka

Vyadhimarga-bahya

Srotas-Rasavaha, Raktavaha

Srotodushtikar-Sang

Sadhyasadhyatva-Sadhya

Symptoms-

Painless (niruja), thin (tanu),

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blackish (shyavavarna) circular patches all over face[3].

Types of disease according to doshas predominance[3]-

1. **Vataja -** Skin appears hard rough in nature with blackish discoloration.
2. **Pittaja -** bounderies are copper red.
3. **Kaphaja -** bounderies are whitish in colour & associated with itching.
4. **Raktaja -** bounderies are coppery red in centre & associated with tingling & burning.

Classification of melasma on the depth of melanin pigments[6]-

1. Epidermal-

Melasma occurs on outermost layers of cells of skin. It is light brown in colour.

2. Dermal-

Melasma occurs between epidermis & subcutaneous layer which is grayish in appearance.

3. Mixed-

Presence of melasma between epidermis & dermis which is dark brown in colour.

Pattern of melasma[5]-

1. **Centrofacial -** 63% on cheeks, forehead, upper lip, nose, chin
2. **Malar -** 21% on cheeks & nose.
3. **Mandibular -** 16% on ramous of mandible, jawline.

Ayurvedic management of vyanga-

1. Nidanaparivarjana[7]-

i.e.to avoid hetusevan

2. Shodhan chikitsa[8]-

1. Siravedha -

2. Abhyanga - with Mahamanjishthadi taila[9], Kunkumadi taila[10], Kasisadi ghrita[11], Sarshap oil[12], Manjishthadi Sneha[25]

3. Nasya - Brungaraj swarasa[13]. Manjishthadi Sneha[25]

3. Shaman chikitsa -

1. For internal use-

1. Gandhapashan churna[14],
2. Somaraji churna[15],
3. Avalgujadi gutika[16].
4. Khadirodaka[17]

2. Lepa for external use-

1. Arjunatwagadi lepa - with honey[18].
2. Manjishtha lepa- with honey[18]
3. Masura lepa - Masuradal paste with milk, honey[21]
4. Raktachandanadi lepa[19]- Raktachandana, manjishtha, koshtha, lodhra, ral, masura lepa
5. Jirakadi lepa[20] - Jire, shahajire, krushnatil, sarshapa with milk
6. Utpaladi lepa - Utpalpatra, tagar, ral, daruharidra lepa
7. Shalmali lepa[21]
8. Yavadi lepa[23]
9. Savarnakar lepa[22]
10. Kunkumadi lepa[24]
11. Varnya Mahakashaya[26]
12. Eladi guti gana[27]
13. Dwiharidradi lepa

Conclusion-

Melasma is a common pigmentary disorder having deleterious impact on patient's quality of life. Ayurvedic medicines & formulations were proved effective without any side effect with raktaprasadaka, twakaprasadaka, varnyakara properties which play a great role in the management of skin diseases like vyanga without any side effect.

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Treatment of shiroroga

KIRAN B. PATIL

General Management of Shiroroga

Commonly in all type of Shiroroga (headache) the following preventive measures should be taken –

• Nidana Parivarjana

According to the treatment point of view, the etiological factors producing headache should be avoided. Commonly rest, avoid holding of the urges, controlling the mind is very helpful. Also other Aharaja and Viharaja Hetus should be avoided.

• Samshodhana Chikitsa

Shirovirechana-Nasyakarma has been advised as the important method of treatment in Urdhavajatrugata Rogas. Thus repeated use of Nasya with special medicines that are indicated for such conditions is to be put into practice in headaches.

• Samshamana Chikitsa

Along with Nidana parivarjana, the vitiated doshas should be brought to their normal state with the help of drugs, based on Samanya Vishesh principles, according to predominance of the manifesting dosha.

• Other Measures

Yogratnakara has described the following measures for Shiroroga. Snehana, Upanaha, Swedana, Dhumpana, Lepa, Langhana, Parisheka, Agnikarma, Raktamokshana, Shirobasti.

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These measures should be applied after considering the predominance of dosha and other general considerations of the patient.

• Sattvavajaya

In the present time counseling is not only beneficial in psychiatric conditions but also in psycho-somatic diseases like Migraine, as a supportive therapy to alleviate the aggravated condition by making the patient able to cope up his illness with better adjustment and adaptation.

Psychological and Psychodynamic methods are no more a palliative management but also a curative treatment in those conditions. The basics approach is,

1. Assurance
2. Exchange or replacement of emotions viz. replacement of Kama, Krodha, Bhaya, Harsha, Irshya etc. with appropriate emotions.
3. Psychoshock therapy

In Bhaishajya Ratnavali, General line of treatment for Shirah-Shoola has been described which are Swedana, Nasya, Dhumpana, Virechana, Lepa, Vamana, Langhana, Shirobasti, Raktamokshana, Agnikarma, Upanaha, Purana Ghrita and Shashtika Shali.

Specific Management of Shiroroga

• Vataja Shiroroga

The following alleviating measures should be employed in management of Vataja-Shiroroga Snehana (oleation), Swedana (formulation), Navana (nasal medication), Lepa (local application), Seka (irrigation), Dhuma (Fumigation) along with Vata-Shamaka drinks, food and hot poultices, Dahakarma (Cauterization) is advisable in Vatika Shiro Rogas, which can be relieved by other measures. The medicines advised are:

Taila – Rasnadi taila, Baladi taila, Trivrit taila, Bala taila

Ghrita – Maha Mayura Ghrita, Mayura Ghrita

• Pittaja Shiroroga

Pittaja Shiro Roga should be treated with Pitta purifying measures as Ghritpana, milk-intake, Nasya, Seka (irrigation), Sheeta lepa (cold poultices); with pitta alleviating food and drinks, Asthapana basti, Virechana, Sira vedha are also applicable. The preparations advised in Pittaja Shiro Roga are Candanadi pradeha, Parisheka, Yashtyadi Ghrita.

• Kaphaja Shiroroga

Kaphaja Shiro Roga should be remedified by Kapha suppressive measures like Shiro Virechana, Vamana, Dhumpana and Gandusha dharana, Swedana (fomentation of head) followed by Dhuma, Nasya, Pradhamana (insufflation of powder) and Kaphahara pralepa (local applicaitions). Old Ghrita, Basti prepared by Tikshana drugs and Daha (cauterization) can be advocated.

Nasya – katphaladi nasya, Arkadi nasya, Hayari nasya.

• Sannipataja Shiroroga

The treatment of Sannipataja Shiro Roga is based on the predominance of dohsa and thus a combined treatment is given. Sushruta advises drinking of Ghrita,

Taila, Basti, Dhumpana, Nasya, Lepa, Swedana.

• Krimija Shiroroga

The appropriate treatment of Krimija Shiro Roga is Tikshna Shiro Virechana. Pradhamana Nasya, Avpida Nasya, Kawalgraha, Ghrita, Nasya should also be employed.

• Suryavarta

Ghritpana, Shiro Virechana, Kaya Virechana, irrigation of head with Ghrita, Taila, Vasa and Majja milk, Upanaha with meat of wild animals and Nasya are useful in treating Suryavarta. Sira Vedha in addition to other medication can also be performed.

• Ananta Vata

Rakta Mokshana, Nasya along with the measures applied in Suryavarta is also advisable when considering Vata as the predominant involvement.

• Ardhavabhedaka

Ardhavabhedaka is best treated with Ghrita, Taila and Majja, Shiro Virechana, Kaya Virechana, Nadisveda, Niruha and Anuvasana, Basti, Upanaha and Shiro Basti.

Acharya Sushruta has also mentioned Nasya with Sirishphala Nasya, Dashmooladyavpidana, Madhukadhyavapidan, Madhuradi-nasya.

• Sankhaka

Sankahaka Roga has been described to be fatal, but if the patient survives the attack of headache for three days then the following measures should be considered – Shiro Virechana and Snehana, Nasya with Ghrita, Shiro Lepa, Parisheka with cold drugs Pradeha, Avapida and Ghrita for intake along with other greasy food.

Sadhya-Asadhyata

In Samhita the Sadhyasadhyata of Shirahshoola is not described specially. The prognosis of a disease is usually dependent upon its severity. The Shirahshoola, which is not chronic than one year and devoid of any major complication, can be termed as Sukhasadhya. On the contrary, when Shiroroga is having history of long chronicity with chances of relapses and is of chronic in nature, no improvement seeing even after undergoing all sorts of treatment can be termed as Asadhya.

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Activation of heme oxygenase-1 (HO-1), a heme-degrading enzyme responsive to a wide range of cellular stress, is traditionally considered to convey adaptive responses to oxidative stress, inflammation and vasoconstriction. These diversified effects are achieved through the degradation of heme to carbon monoxide (CO) biliverdin (which is rapidly converted to bilirubin by biliverdin reductase) and ferric iron.

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- reach out

Prucalopride (Resolor®) is a novel enterokinetic agent. It is the first of a new generation of selective, high-affinity 5-HT_4 receptor agonists. This drug, which has been developed for the treatment of chronic constipation in adults in whom laxatives fail to provide adequate relief, stimulates gastrointestinal (GI) motility through its effects on 5-HT_4 receptors.

- British Journal of Clinical Pharmacology

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The second peptide with incretin activity, a glucagon like peptide (GLP-1) was discovered in 1987. Both GIP and GLP-1 are extremely short-acting. Plasma half-life of GLP is 1-2 minutes. This rapid inactivation is due to a ubiquitous enzyme, dipeptidyl peptidase-IV (DPP-IV).

In 1992, J.Eng, J P Raufmann and co-workers identified a breakthrough in the most unusual place, after considerable research. They found a peptide in the venom of a poisonous lizard – the 'Gila monster' (Heloderma suspectum), seen in Arizona and Mexican deserts. The peptide was mainly in the saliva of this lizard and was called extendin-4. It is a potent agonist at the GLP-1 receptor of insulin secreting beta cells in pancreas and remains effective for much longer than human GLP-1.

Journal of The Association of Physicians of India

OCCASIONAL REVIEW

Lymphoma in Rheumatoid Arthritis — Catastrophic Sequela of a Common Disease

Rheumatoid arthritis (RA) is a chronic immune-mediated, polygenic disease that causes chronic joint inflammation and deformity, with many extra articular manifestations. Incidence of malignancy in patients with RA has been studied in detail and it has been shown that patients with RA have an overall 10 % more risk of developing malignancies as compared to the general population, particularly lung malignancies and lymphomas.

The WHO in 2001 classified lymphomas into three main types —B-cell, T-cell and Hodgkin's lymphoma; which were further subdivided into over 40 categories. The classification was updated in 2008 and then in 2016; and many new categories were created.

A detailed meta-analysis noted that the increased risk of lymphoma varies with various rheumatological conditions and concluded it being highest in sjogren's syndrome, rheumatoid arthritis and SLE — in that order. Other disorders like dermatomyositis, polymyositis and psoriasis also confer higher risk of developing lymphomas, but the rates vary in various studies.

Rheumatoid arthritis is a chronic immune mediated disease that involves the joints and has many extra articular manifestations. RA has been associated with many malignancies in individual case reports, however a meta-analysis concluded that true association existed only in lung malignancies and lymphomas. Both Hodgkin's and non-Hodgkin's lymphomas occur more frequently in patients with rheumatoid arthritis; the association being strongest with diffuse large B-cell lymphoma. Overall the risk of developing lymphoma in a patient with RA is two to three times the general population.

Many factors may contribute to the development of lymphoma in a patient with rheumatoid arthritis. These include genetic factors, environmental factors, high inflammatory activity and treatment related factors. Genetic factors were not found to be of no major importance in a study involving first degree relatives of patients with RA. Smoking is the only major identified environmental factor but the evidence for the same is weak and may even be conflicting. High disease activity has been found to have strong association with development of lymphoma in patients with RA in an elegant study. Disease activity in this study was measured using ESR, number of inflamed joints and the doctor's global assessment. Another group found felty's syndrome as marker of high disease activity and thus a risk factor for development of lymphoma in patients with RA. There is controversy regarding role of immunosuppressive therapy including methotrexate in the causation of lymphomas. In a study involving 1767 RA patients, spanning over two decades, it was showed that high inflammatory activity (elevated ESR) instead of therapy with methotrexate or prednisone, determined the risk of developing lymphoma. Hence, it is speculated that DMARD therapy may, conversely, lower the lymphoma risk.

Many studies have proposed various mechanisms involved in lymphomagenesis. It is believed that clonal proliferation of B-cells may be a major pathogenic event. The role of B-cell in development of RA-DLBCL was shown in a study that detected higher expression of APRIL (A Proliferation-Inducing TNF Ligand, also called TNFSFI3) in RA-DLBCL patients with high disease activity.

Diffuse Large B-cell lymphomas with over-expression of c-myc and bcl-2 at a protein level (detected by immunohistochemistry) are referred to as "double-expressor" phenotype of DLBCL. Over-expression is defined as greater than 40% c-myc expressing cells and greater than 50% bc1-2 expressing cells. At a genetic level (detected by fluorescence in-situ hybridization), if dual re-arrangement of c-myc and bcl-2 is detected, it is called "double-hit" phenotype of DLBCL. This double-hit DLBCL has been reclassified as "high grade B-cell lymphoma (HGBL)" by WHO in 2016. Double-expressor and double-hit phenotypes may be related but the terms cannot be used interchangeably, as all double-expressor phenotypes may not have dual re-arrangement at the genetic level. The DLBCL in our patient had an over expression of c-myc and bcl-2, and is thus a double expressor phenotype. The recognition of double expressor is important for risk stratification and prognostication of the lymphoma. The poor prognostic effect was proved in an independent cohort of 140 double expressor lymphomas.

The double-hit and double-expressor phenoytes have a bearing on the treatment too. It has been shown that standard treatment with R-CHOP (rituximab plus cyclophosphamide, doxorubicin, vincristine, prednisone) may be suboptimal and R-EPOCH (etoposide, prednisone, vincristine, cyclophosphamide, and doxorubicin plus rituximab) regimen might have more favourable outcomes. Large prospective studies are, however, required to find the optimum treatment for such lymphomas.

Rheumatoid arthritis is a common connective tissue disorder, in which the risk of developing lymphomas is much more as compared to the general population. The most common lymphoma associated with RA is diffuse large B-cell lymphoma. High disease activity rather than therapy contributes significantly to the risk of developing lymphoma in RA. A physician must treat his patients with rheumatoid arthritis adequately; and strive to reduce the disease activity; thus reducing the risk of lymphomas. Lymph nodal swelling in patients with RA must alert the physician to look for an underlying lymphoma. When recognised as a diffuse large B-cell lymphoma, it is imperative to quantify c-myc and bc1-2 expression by IHC; which will in turn help to stratify risk, choose the appropriate therapy and prognosticate. **- JAPI**

Gender Inequity in Cardiovascular Care - Global Perspective

In the last decades, promotion of women's health has become a growing field for health professionals. Although global society has recognized the importance of providing women with appropriate health services to maintain healthy families and communities, women are still underserved in every segment of health systems worldwide. The inequity in health services for women results from a lack of knowledge, stigma, and social norms for women. This gender inequity exists in every segment of the health system worldwide. A review of online global research on an important health issue for women has been conducted. The findings indicate that women with cardiovascular disease are struggling with gender inequity in health services throughout the world. Recommendations for addressing this dilemma require more investment in research into women's health; empowering women to have a role in decision making, and in global collaboration to replicate successful models and programs for women's health.

Although women are at higher risk of developing heart disease than men, there is still ignorance about the possibility of death from cardiovascular disease; especially for young women, due to the presence of estrogen. Estrogen inhibits the formation of atherosclerosis and artery spasm, causes vasodilation, and improves endothelial function and so enhances the functioning of blood vessels. In Asia and Australia, the risk of dying from cardiovascular disease is higher for women; especially for smokers and ex-smokers. A study in Europe indicated that women have a lower risk of developing cardiovascular disease but women who smoke have a higher risk of disease than nonsmokers. Death from cardiovascular disease in women is linked to high concentrations of triglyceride.

Social and cultural norms create various gender stereotypes for both men and women. Health inequity for women is the result of these stereotypes; since it impacts women's ability to access health care services and shapes the negative attitude of some health care providers towards those women. Collaborative work across health and social care is the key factor to promote women's health and eliminate gender inequity.

Barriers and Factors for Health Inequity

This huge gap in treating women's health issues effectively is due in part to lack of research and also to the absence of policy to support gender-based medicine and gender sensitivity. In the 1970s, women were excluded from clinical trials because it was claimed that factors such as the menstrual cycle and menopause would change the response to the medicine. In addition, the possibility of pregnancy would increase the responsibilities of the researchers. It was assumed that there was no difference between men and women in the responses to a drug and any pathology it might cause, owing to the lack of knowledge of female physiology.

Another factor in the lack of, gender based research is that policy makers are ignorant about the gender differences between men and women, which lead to different health needs; even though several studies have indicated the need for a more gender-based approach to research and treatment. Existing plans to fund health care systems that address the unique problems faced by women seeking health services are not effective and the poor health outcomes for women subsequently impact the SES for women. Government should support working women by creating policies that support good health and quality of life, such as appropriate prenatal and dependent health-care leave policies. More women than men live in poverty and women are more likely to be unable to afford health care or to get treatment.

However, the cardiovascular health disparity in women is mainly due to inadequate knowledge about women and cardiovascular diseases. In addition, insufficient efforts are being made to increase women's awareness of cardiovascular disease.

Recommendations

There is an urgent need to implement more strategies and models to minimize the gap in gender equity in health. The Center for Disease Control and Prevention has designed a Well-Integrated Screening and Evaluation for Women Across the Nation (WISEWOMEN) program for screening and prevention. The program has been shown to have a significant impact in promoting the health of populations at risk. Another successful model in the US is Heart Truth, which uses social media to reach women and increase their awareness of cardiovascular disease. The search did not find any successful models for promoting women's cardiovascular health in Africa or the Middle East.

The Institute of Gender and Health in Canada has identified the national health priorities through brainstorming and interviewing sessions with the public and professionals. Combining these data with research reviews and analysis methods will increase national and international knowledge about the impact of sex and gender on health and ultimately influence policy, leading to implementation of programs to address gender inequity.

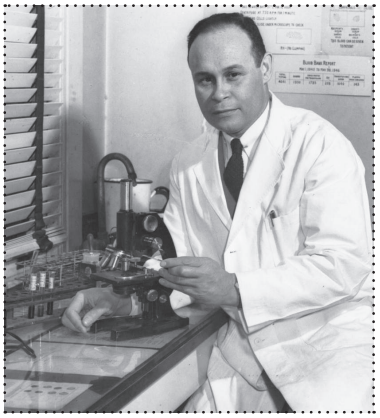
It is important that staff are trained in gender sensitivity and that institutes practice it. Appropriate training should be initiated after gender analysis guidelines have been used to evaluate for gender sensitivity. More research into the genetic, physiological, and behavioral differences between sexes and genders is required. In addition, any research should consider cultural differences within different communities and ethnicities. It is critically important that governments should implement policies that include more women in decision making in health care systems to minimize gender inequity. The media and other organizations in society should be encouraged to participate in supporting women; especially vulnerable groups of women who suffer from cardiovascular disease. In addition, vulnerable subgroups such as the elderly, pregnant women, teenagers, and those with low income must be considered. Governments and other organizations should recruit more volunteers to engage the public with these vulnerable groups, and to eliminate the stigma and barriers that prevent society from reaching out to help. National and international collaboration will be needed to initiate these measures.

The inequity in health services that women face globally is directly linked with the knowledge and understanding of sex and gender by health professionals, governments, and society. Women are always at risk as they live under different types of inequity, even in the most developed countries. The lack of effort towards empowerment and limited knowledge of women's needs have a strong impact on current levels of health inequity. For society to be healthy, we must first have healthy women, and therefore strong global advocacy and collaboration is needed.

We would like to thank Dr Rodriguez Daniel, PH.D Associate Professor of Public Health, Philadephia, USA for his help in Concept and revising the article.

- JAPI

Charles R Drew Pioneers in Blood Bank



Charles Richard Drew
Father of blood banking

Charles Richard Drew was an African American Surgeon who organized America's first large – scale blood bank. He was born in Washington DC in 1904. From a middle class background, Charles worked as a newspaper boy in Washington streets, doing summer jobs like lifeguarding local swimming pool and working in construction jobs. In school he excelled in sports.

Drew went to Amherst College in Massachusetts on an athletic scholarship. His biology classes in school, his sister's death from tuberculosis and his own hospitalization due to football injury fostered his interest in medicine. After graduation, he worked as athletic director and instructor of biology and chemistry at Morgan college for two year, to earn money for medical school.

After initial setback, he got admission at McGill University Faculty of Medicine. At McGill he was a star athlete and a star student. During his surgical residency, he worked with professor John Beattie who was exploring ways to treat shock with transfusion and fluid replacement.

In 1935, he joined the faculty at Howard University college of Medicine as a pathology instructor and later became the chief surgical resident. He trained with Allen O Whipple at New York's Presbyterian Hospital. At Presbyterian, he worked on blood chemistry, preservation and fluid balance. His dissertation was on an experimental blood bank. He became the first African American to earn a doctorate from Colombia University.

After the fellowship, he worked at Howard. He directed the Blood for Britain project in 1940, to ship plasma to Britain. Drew instituted procedures and standards for blood collection, processing, storage and transport.

In 1941 he initiated a national blood banking system, mobile blood donation stations. African American Segregation policies initially stalled his pioneering efforts. While working, Drew also passed his American Board of surgery exams and became Chair of the surgery at Freedmen's hospital and examiner for the American Board of Surgery. He campaigned for inclusion of black physicians in medical societies and AMA, beside training and mentoring students and resident. Drew is recognized as the founder father of blood banking system in the USA, working against all odds at a time of segregation of blacks and whites in all fields including medicine.

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DR. N. HARIHARASUBRAMANIAN MD, PHD

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A teenager presents with headache for about two weeks, horizontal diplopia on right lateral gaze, slight dimming of vision while bending forwards. Bilateral papilloedema is seen on fundus examination. She has no history of diabetes, hypothyroidism or menstrual problems or PCOS. She has gained weight over the past three months

What is the likely diagnosis?

Question and Answer for the "Case of the Month" - June 2019

A 2 year old baby has strabismus right esotropia and yellow – white pupillary reflex in the right eye.

What is the diagnosis?

Answer : Retinoblastoma

Medi Quiz answers for the month July 2019

1 – A	5 – B
2 – B	6 – A
3 – C	7 – C
4 – D	8 – B

Correct answers received for the "Case of the Month" - May 2019

Case : A 30 year old woman presents with a tense, well defined smoothness in the upper outer quadrant of the left breast, becoming slightly larger premenstrually. Aspiration yields a clear yellow fluid, with disappearance of the menses.

What is the diagnosis?

Answer : Fibrocystic disease

Correct Answer received from

Dr. Sukhminder Singh Dhillon
MD (Medicine), FMGEMS,
DHILLON CLINIC
Near Summer Field School,
MOGA, Pin- 142 001. PUNJAB.

MEDI QUIZ

1. Iron stored in intestinal mucosal cells is complexed to:

   A. Ferritin
   B. Transferrin
   C. Transcobalamin II
   D. Oprelvekin

2. Drug useful in steroid – induced osteoporosis is: A. B. C. D.

   A Vitamin D
   B. Alendronate
   C. Calcitonin
   D. None of these

3. Methionine to cysteine conversion depends on

   A. Riboflavin
   B. Thiamine
   C. Pyridoxine
   D. Cyanocobalamin

4. Avidin of egg white antagonizes :

   A. Pyridoxal
   B. Choline
   C. Pantothenic acid
   D. Biotin

5. Carnitine is beneficial in:

   A. Oxidative phosphorylation
   B. Oxidation of fatty acids
   C. Both
   D. Neither

6. Oral iron absorption is facilitated by:

   A. Ascorbic acid
   B. Phosphates
   C. Both
   D. Neither

7. Daily requirement of women B12 is :

   A. 50-100 mcg
   B. 0.1-0.5 mcg
   C. 1-3 mcg
   D. None of these

8. Which of these are Vitamin K dependent?

   A. Factor I
   B. Factor II
   C. Factor VIII
   D. All of the above

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