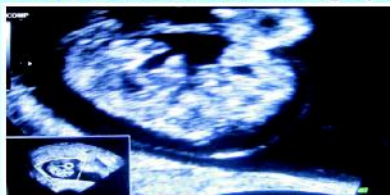


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- Blastocyst Culture
- Operative Laparoscopy & Hysteroscopy
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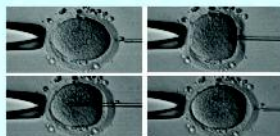
IVF



Dr. Laxmi Agrawal
(Art Specialist)



Dr. Hasmukh Agrawal
(Art Specialist)



Reshambai fertility Hospital

Center For Human Reproduction ivf-icsi (Test Tube Baby Center)

Swastik Complex, Opp. Rajsthan Hospital,
Shahibaug, Ahmedabad-380 004.

Phone : 079-22863777 / 3444, M. : 094266 70791 Fax : 22865596
E-mail : info@reshambaiivf.org • Website : www.reshambaiivf.org

Time : 10.00 a.m. to 2.00 p.m. • 5.00 p.m. to 7.30 p.m.



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VOL. 16

MAY-2021

ISSUE-1

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CAMP ON 21-03-2021, SUNDAY AT AIMS, LAPKAMAN



'SERVICE TO MANKIND... NOT DESTINATION... BUT WAY OF LIFE'

Message From President's & Hon. Secretary's Desk

Dear Members,

“The Greatness of Community is most measured by the Compassionate Action of its Members.”

Coretta Scott King.

We have passed through 2nd wave of COVID and we had seen and faced the worst condition in our life. We are really passing through the toughest and the most challenging time just now. We are facing so many difficulties and problems what we had not expected at all and also so we were not prepared for that. The people are running here and there in search for beds in hospitals, medicines, oxygen and so on... We, doctors are doing very hard and over work for the patients, for the society and for the nation. And not only we, but para medical staff, nurses, and other all working in hospitals, clinics and laboratories, all are standing on legs without fatigue, tiredness and fear. So, it is the community which works for their citizens, for their fellows and other people also. Let us all salute the whole world of helping and working persons for society and community.

Because of COVID, we were not able to organize any big and public program last month also. Last month on 20th March we had multispecialty diagnostic camp at Ahmedabad Institute of Medical Science, under banner Aao Gaon Chale. We had physicians, orthopedic surgeons, dermatologist,

ophthalmologist and family physician who had given their service and have participated in this camp. We are thankful to all friends and AIMS for better management of whole program.

We also had Facebook live program on 5th April which is celebrated as World Asthma Day. Respected, Dr. Narendrabhai Raval, Senior Chest Physician and Pulmonologist, had given excellent presentation in very easy language. He had explained about Asthma and treatment and importance of inhaled Steroid. Dr. Urvesh Shah, known Pathologist and Microbiologist, was coordinator and accompanied very nicely. We are thankful to both respected doctors for giving their precious time.

We are also meeting the different officers and authorities for the difficulties we are facing in the management during COVID. We maximally try to coordinate and help government for better and smooth administration. Still our war is not ended. Today while I am writing this, warning of 3rd wave of COVID is already received. We are planning in better way to fight against it. Let us join hands in this war.

“A true community is not just about being geographically close to someone or part of the same social web network. It is about feeling connected and responsible for what happens. Humanity is our ultimate community, and everyone plays a crucial role.”

Thank you.

Jay AMA

Jay IMA

Dr. Kiritkumar C. Gadhavi

President

Ahmedabad Medical Association

Dr. Dhiren R. Mehta

Hon. Secretary

Ahmedabad Medical Association

CAMP ON 21-03-2021, SUNDAY AT AIMS, LAPKAMAN



CAMP ON 21-03-2021, SUNDAY AT AIMS, LAPKAMAN



Be a Member of
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Health Scheme
and N.S.S.S.



A.M.A. BULLETIN INDEX

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DR. SANJEEV PHATAK	DR. MONABEN DESAI	DR. MANJIT NAYAK
DR. MAULIK SHETH	DR. URVESH SHAH	DR. VIPUL SHAH, ID

Ahmedabad Medical Association Senior Citizen Club Programme

A Webinar is organized on a very important issue of human life.

The greatest tragedy of human life is when you have to live your life alone after losing your life Partner.

Date : 6-6-21, Sunday.
Time : 11.00 am to 12.00 noon
Topic : LIFE WITHOUT 'LIFE'.
 (જીવન, જીવનસાથી વગરનું)
Speaker : Dr. Hansal Bhachech
 M. D. (Psychiatry)
Moderator : Dr. K. R. Sanghvi

Please register on the link.

This program is arranged with support of Ahmedabad Medical Association and AMA Ladies Club.

The Webinar will be on our You Tube channel.

Co-Ordinators

Dr. Abhay Dixit **Dr. Kirti Sanghavi** **Dr. Ramesh C. Shah**

Dr. Kiritkumar C. Gadhavi
 President

Ahmedabad Medical Association

Dr. Dhiren R. Mehta
 Hon. Secretary

Ahmedabad Medical Association

SCIENTIFIC PROGRAMME

Scientific Program : Webinar

College of General Practitioner

Dear Members,

Scientific Webinar is organized by AMA and College of General Practitioner covering the most important subjects of current time. We have invited different experts from different specialties to express their knowledge and experience. The details are as following :

Topic : COVID 3rd Wave, Possibilities and Solutions.
 What we learnt from 2nd Wave?

Panelists :

- 1) Dr. Dileep Mavalankar, Epidemiologist.
- 2) Dr. Jigar Mehta, Intensivist.
- 3) Dr. Vipul V. Shah, ID Specialist.
- 4) Dr. Parth Desai, COO, KD Hospital.
- 5) Dr. Gargiben Patel, Pediatrician, Professor and HOU, B. J. Medical College.
- 6) Dr. Mukesh Maheshwari, Pathologist.
- 7) Dr. Kamlesh Lala, Family Physician.

Moderator : Dr. Urmanbhai Dhruv, MD Director,
 Department of Internal Medicine & Diabetes, HCG Hospitals,
 Ahmedabad.

Co-ordinator : Dr. Jaswantsinh Darbar

Time : 10-30 am to 12-00 noon.

Date : 13/6/21, Sunday.

Program will be live on Facebook and You Tube page of Ahmedabad Medical Association.

Dr. Kiritkumar C. Gadhavi
 President

Ahmedabad Medical Association

Dr. Dhiren R. Mehta
 Hon. Secretary

Ahmedabad Medical Association

WE WELCOME FOLLOWING NEW LIFE MEMBERS

10243	L	DR. GANDHI RONAK RAMESHCHANDRA
10244	L(Transfer)	DR. JAIN RAMILABEN R.
10245	L	DR. JAIN URVASHI PRADEEP
10246	L	DR. MANGROLIYA JAYDIPKUMAR VASANTBHAI
10247	L	DR. JINDANI SHAHNA ANISHBHAI
10248	LC	DR. VAIDYA NIRAV JITENDRAKUMAR
10249	LC	DR. PAREKH VIHANGI ASHOKBHAI
10250	L	DR. PATEL HANEE HEMANTKUMAR

RATES FOR ADVERTISEMENT IN AMA BULLETIN

WITH EFFECT FROM 5-6-2013

PARTICULARS	AMA MEMBER	GROUP MEMBER	NON MEMBER CORPORATE HOSP.
Last Cover Page (Colour)	Rs. 10000	Rs. 11000	Rs. 12000
Inside Cover Page Total 4 in (Colour)	Rs. 8000	Rs. 9000	Rs. 10000
Center Page - the Rates are per page (Colour)	Rs. 8000	Rs. 9000	Rs. 10000
Full Page Colour	Rs. 5500	Rs. 7000	Rs. 9000
Full Page Black & White	Rs. 3000	Rs. 6000	Rs. 8000
Half Page B/W.	Rs. 2000	Rs. 4000	Rs. 6000
Quarter Page B/W.	Rs. 1000	Rs. 1500	Rs. 2000

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Size of Bulletin

Full Page 18x12 cm Half Page 9x12 cm Qtr. Page 9x6 cm

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- For One year Advertisement 15% Discount • For Six Month Advertisement 10% Discount
- Please Send your Advertisement in CDR / JPG Format only at AMA before the Date.
- Please Send your Advertisement Before Dt. of 15th each Month.

Report of COVID Help Line

Ahmedabad Medical Association has started COVID Helpline for general public from 3rd May and is still going on. About 35 doctors are participating in this project. All doctors are receiving more than 40-50 calls daily. We have allotted different time slot on different days according to possible convenient time of doctors. We have given in different print as well as social media. We are really getting excellent response from different people from different cities. We are really lucky that we can explain well about their doubts and can clear their myths and misconceptions. To educate anyone is really a biggest service to society. We are given such opportunity to serve society in different way. We are thankful to all print medias for highlighting the names and contact numbers of all doctors in their newspapers. We are also thankful to all doctor friends for rendering their time for this noble work.

Report of Diagnostic Camp

We had organized multispecialty diagnostic camp at Ahmedabad Institute of Medical Science, Lapkaman on 21st March, Sunday. We had examined and treated almost more than 350 patients. Many doctors including Family Physician, Physician, Orthopedic Surgeon, Ophthalmologist, Dermatologist and General Surgeons, had given their

service and valuable time for noble cause. We are thankful to all dear doctor friends. We are also thankful to KD Hospital and doctors of hospital for giving their service. We are also thankful to Ahmedabad Institute of Medical Science and staff for excellent arrangement and good hospitality. We are thankful to Dr. Mehulbhai Shah, Past President, AMA for planning of this program.

Report of Facebook Live on World Asthma Day

As all of us know well that World Asthma Day is celebrated on 5th May every year through out the world. We at Ahmedabad Medical Association, also celebrate it in different types. This year because of COVID we were not able to perform any public program. But we had planned Facebook Live program on that day. We had invited Dr. Narendrabhai Raval as speaker. He is very senior Chest Physician and Pulmonologist of our city. He had explained all facts regarding Asthma in detail and in very simple language so all can understand it easily. He also explained about treatment and inhaled steroids by different equipment. He also explained about COVID in Asthma patient and how to take care in this pandemic. Dr. Urvesh Shah was coordinator of this talk. He is Professor of Pathology and Microbiology at GCS Medical college. There was nice interaction and talk in between two speakers. It was attended by many viewers including doctors. We are thankful to both speakers and all viewers of this program.

OBITUARY

We send our sympathy & condolence to the bereaved family.
May their soul rest in eternal peace.



DR. NARENDRABHAI S. SHAH

L-1022 M.B.B.S.

Date of Birth : 09-04-1947

Date of Death : 10-04-2021



DR. RASIKLAL J. CHHAPAN

L-116 OPHTHAL

Date of Birth : 06-08-1927

Date of Death : 19-04-2021



DR. RANI DINESHCHANDRA MORAKHIA

L-4570 M.D., D.G.O.

Date of Birth : 23-12-1970

Date of Death : 21-04-2021



DR. GYANCHAND S. GUNANI

L-1325 F.C.I.P., MRSH

Date of Birth : 19-10-1944

Date of Death : 29-04-2021

CORONA WARRIORS



DR. BALUBHAI K. PATEL

L-10078 FAMILY PHYSICIAN

Date of Birth : 11-01-1941

Date of Death : 17-04-2021



DR. NAZIRMOHMED D. GHASURA

Retd. Add. Director (Health)

L-2546 DPH

Date of Birth : 21-07-1942

Date of Death : 25-04-2021

UTILITY NUMBERS

EMERGENCY

Emergency - Medical,
police, Fire108
Police100
Fire101
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POLICE

Police Control Room25630100
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P.R.O. To Commissioner25633333
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FIRE STATIONS

Gomtipur22776996
Jamalpur25397959
Jashodanagar32981439
Manianagar25470221
Naroda22200715
Odhav22875434
Panchkuva22120388
Sabarmati27507302
Chief Fire Officer HQ22148466



World Environment Day

5th June is celebrated as World Environment Day in many countries of world. Why ? Why should we celebrate it? What makes us to think for it? Why do we worry for better environment ?

“If humanity has to live for a long time, you have to think like the Earth, act as Earth and be the Earth because that is what you are.” - Sadhguru.

Once Sadhguru ji was asked, what will happen if there will be no human on the earth. He replied that nothing will happen. Because before the existence human being, earth was there, space was there, animals and birds were there, and all beauty of mother nature was there. We also have seen during this COVID pandemic, in absence of human being, nature has rejuvenated everywhere, on mountains, in valleys, in seas and rivers, in gardens and forests, everywhere. So now, what is Environment?

Environment means anything that surround us. It can be living (Biotic), or non living (Abiotic) things. It includes physical, chemical and other natural forces. Living things in their Environment... since everything is part of Environment, of something else, the word Environment is used to talk about many things.



The term, ` Natural Environment ` refers to the non-human-made surroundings and conditions in which all living and non-living things exist on the Earth. (Soil, Vegetation, and so on...)

World Environment Day was established in 1972 by the United Nations on the first day of the Stockholm Conference. Environment mainly consists of Atmosphere, Hydrosphere, Lithosphere, and Biosphere. But can be divided into two types, Micro environment and Macro environment.

What factors are dangerous for Environment ?

- 1) Pollution
- 2) Global warming
- 3) Overpopulation
- 4) Waste disposal
- 5) Ocean acidification
- 6) Loss of biodiversity
- 7) Deforestation
- 8) Ozone layer depletion
- 9) Acid rain
- 10) Public health issues

What can be done and Why ?

- 1) A good planet is hard to find.
- 2) Deserts and Desertification-Don't Desert Drylands

- 3) Time for Nature
- 4) Only one Earth
- 5) If you can't reuse it, refuse it.
- 6) Join hands to save Environment.
- 7) Plant a tree today.
- 8) Reduce, Reuse, Recycle.
- 9) Save Earth to save Life.
- 10) Don't let our future dry up.
- 11) Global warming is Global warning.
- 12) Keep clean and Go green.
- 13) A tree for Peace.
- 14) Save the Environment in present for better life in Future.
- 15) Say No to Pollution.
- 16) Stand up for the Earth.
- 17) Waste water today, live in Desert tomorrow.
- 18) Our Earth, Our Habitat, Our Home.

"Let's nurture the Nature so that we can have a better Future."

"Earth is our Mother. In spite of our desire to harm our Mother, she will always love us forever."

--- Compiled by **Dr. Dhiren Mehta**

**લેડીઝ-ક્લબ****"STRONG WOMEN EMPOWER EACH OTHER"**

Dear Friends,

મઝામાં જ હશો. વર્તમાન પરિસ્થિતિને ધ્યાનમાં લઈ આપણે રૂબરૂ મળી શકતા નથી પરંતુ Zoom meeting દ્વારા જ મળ્યાનો આનંદ માણવો પડે છે.

૨૪ એપ્રિલે સ્પીકર ચિંતનભાઈ દ્વારા આપણે ગાર્ડનીંગ માટેની ખૂબ જ સુંદર માહિતી મેળવી. ખૂબ જ મોટી સંખ્યામાં બહેનો વેબિનારમાં જોડાઈ.

૨૮ એપ્રિલે પ્રેસિડેન્ટ ભારતીબેન દ્વારા ગ્રોસરી કીટનું વિતરણ કરાયું.

૧૪ મે ના રોજ યોગ શિક્ષક જયોતિબેન દ્વારા કોરોના કાળમાં ઈમ્યુનીટી વધારવા માટેની બ્રીધીંગ એક્સરસાઈઝ અને મેડીટેશન શીખવાડવામાં આવ્યું.

પ્રોગ્રામ નં. ૧૪

આપણે આપણી ત્વચા અને વાળની માવજત વિશે સભાન તો હોઈએ જ છીએ. તેમ છતાં ઉંમર અને વાતાવરણને કારણે અને અયોગ્ય ખોરાકને કારણે ત્વચા અને વાળને વિપરીત અસર થતી હોય છે. તો આવો તેની યોગ્ય સંભાળ વિશે આપણે નેચરોપથી ડૉ. મિતા શાહ પાસેથી માહિતી મેળવીએ.

તારીખ : ૨૨-૦૫-૨૦૨૧, શનિવાર

સમય : બપોરે ૩.૦૦ થી ૫.૦૦ કલાકે

Zoom meeting ID - 996 8826 8013

Password - 4321

બહેનો જૂન મહિનાના પ્રોગ્રામ માટે Whats app જોતા રહેશો.

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ડૉ. કિરીટકુમાર સી. ગઢવી

પ્રમુખ

અમદાવાદ મેડિકલ એસોસિએશન

ડૉ. ધીરેન મહેતા

સેક્રેટરી

અમદાવાદ મેડિકલ એસોસિએશન



Meditation (ધ્યાન), A Boon To The Mankind

- Dr. G. G. Oza

The human brain contains little more than 100 billion (અબજ) (1 followed by 11 zeroes) neuronal cells (neurones) and there are about 10 lacs billion intercommunications between them. That is why Emily Dickinson says : **“Human brain is wider than the sky.** Dr. Pankaj Joshi says the same thing when he writes : **“Each neurone is, as if equivalent is a બ્રહ્માંડ .**

The mediators of brain and autonomic nervous system are called neurotransmitters e.g., serotonin and endorphin for peace of mind, happiness while catecholamines and steroid like cortisone are for aggression, anger, retaliation etc., (Fear-Fright - Flight - Fight Phenomenon). All the same, our present knowledge about intricacies of the brain is far from complete.

Rushi Patanjali is the founder - Guru of what we call Yoga (યોગ, અધ્યાત્મવિદ્યા, Spirituality) of which meditation (ધ્યાન) is, perhaps, the most popular component. In the haste and hurry of present era, **When people are too busy to be happy**, meditation is a time-tested and medicelly-proved gift to the mankind.

To put it simply, meditation is an inward journey (actually a yatra) via an unseen, abstract caridor. For introspection, for meeting one's self for self-analysis and

ultimately for self-realisation. The word 'introspection' is very significant because we have a nasty habit of looking onwards, (sometimes waywards !) to evaluate, criticize and comment on all others (from near to far) but we forget to look into ourselves to find out our true colours. Thus, meditation teaches us to judge our interior world (મનોજગત).

Meditation consists of **pranayam** (taking the breath in steadily, naturally, deep but not forcibly and then exhaling it out over a few seconds, smoothly, evenly, not jerkily nor forcibly and at the same time focussing, concentrating the inner eye (મનઃશુદ્ધિ) over a word e.g. 'Ohm' or a holy thought or a gentle flame or God or the centre point between he eyebrows. The word 'mind' is intentionally not used because it focusses more on intelligence (બુદ્ધિ) rather than on emotions, feelings (મન) which, in our language and tradition, are two different functional faculties.

Meditation can be practiced at any convenient time of the day though morning time is considered the best time because during this period receptivity is more and the environment is quiet, peaceful and pure. Just as before starting morning exercise e.g., walking, a few minutes of 'warming up' is advised, in the same way before starting meditation, a few minutes of 'cooling down' (of mind and mood) will not be out of place, especially at other times of the day. પશ્ચાસન (sitting, cross-legged bent-knee posture) is popular and appropriate to the occasion but any other

convenient, comfortable posture (except recumbent) would do (e.g., sitting on a comfortable chair or sofa). In recumbent position, there are chances of slipping into sleep! All along, the eyes should be closed to prevent external stimuli, during meditation, the inner eye (મનઃચક્ષુ) opens up.

Pranayam increases the O₂ (Oxygen, યાજ્ઞવલ્ક્ય) supply to the distant, deeper unaerated segments (parts) of the lungs, increases the ventilation and prevents stagnation there. Oxygen in the blood (PO₂) increases; so all the parts of the body receive more O₂. At the same time the harmful carbon dioxide (CO₂) is exhaled out.

There is slowing of the heart beats (pulse) and blood pressure is regulated and lowered beneficially.

Capacity to fight diseases (Immunity) is increased. Most importantly, maximum benefits are bestowed in relation to the mind, namely :

- Peace of mind and pleasure (આનંદ) is established or restored.
- Hostility makes way for happiness (મસન્નતા).
- Tension is replaced by tranquility.
- Worries are checkmated by wellness.

- Restlessness gives way to relaxation, repose and respite.
- Anxiously envy is outwitted by ecstasy.
- Ego walks out, equanimity enters in.
- Fretting and frowning is over-ruled by forgiveness. **He not only forgives but even forgets that he has forgiven.**
- He is, now composed as also compassionate.
- His personality exudes empathy and sympathy.

During meditation, what does one feel is difficult to describe. He is, as if, bathed in અનુભૂતિ. It envelops you and yourself. Some divinity embraces you. You feel that you are on the hill-top of happiness, Mellow mental state, scintillating silence, vibrant vacuum, feather-weight fullness, a breeze, exhilaration, a walk along the sea shore in moonlight etc. Frankly speaking this experience, this feeling is beyond the realms of words. At the same time it is actual, not imaginary.

As the practitioner reaches higher summits of spirituality, he attains further traits like સાક્ષીભાવ (impartial silent observer). His life is now, like **a lotus in a lake** (જલકમલવત). He is in it, but not into it, he is within and still he is withdrawn. His inner self progresses and ultimately climbs



the ladder of humanity, spirituality and even evolution (ઉચ્ચિત્તિ).

Medical science with its tools and technology has studied it, accepted it, it and started prescribing meditation in general and certain diseases in particular. It should be included in the syllabus of medical curriculum and teaching. (English language has no equivalent words for several words like મન, ચિત્ત, અનુભૂતિ, પ્રસન્નતા etc. Therefore, there was no alternative to invite original Indian words).

Therefore, regular meditation must be made a vital, routine component for all (Including medicos). In short, meditation is a medication, but without drugs. For the health and happiness of the mind and the body. Therefore, earlier a person starts it, the better (also, if you have ignored it for long, it is never too late to start !).

(A Preliminary medical check-up is advisable for all, especially those who have cardiac, respiratory, throat or same other medical problem).

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સર્વે સન્તુ નિરામયા:



Mucormycosis : A review Article

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Introduction :

Human race is struggling with a virus for last 16 months. A by-product of this struggle has created a new monster. Many people recovering from COVID-19 have of late been afflicted by black fungus – or mucormycosis – disease. Mucormycosis may be a new name for lay public across the globe but not a new disease for medical personnel. It is a fungal disease known since ages to medical community seen characteristically in patients having uncontrolled diabetes. The incidence and prevalence is rising very rapidly across the globe, more so in India, thanks to the over aggressive use of life saving steroids and immunosuppressive agents like Tocilizumab.

Definition :

Mucormycosis (previously called zygomycosis) is a serious but rare fungal infection caused by a group of molds called mucormycetes. Mucormycosis is the general term that indicates any fungal infection caused by various genera of the class Zygomycetes. Another term used in medical and lay publications that means the same is phycomycosis. **Mucormycosis can result in an acute, rapidly advancing, and occasionally fatal**

disease caused by different fungi commonly found in the soil or environment.

Role of fungus in health and disease :

Fungi evolved 400 million years ago and play an important role on Earth. They have helped plants move from their aquatic habitats to land, and still help them obtain minerals from the soil. Fungi decompose organic litter and recycle the nutrients locked up in the leaves and wood.

Some of them have also evolved to become plant pathogens: they infect plants, multiply and disperse to other plants, leaving destruction in their wake. The great Irish famine of 1845 that left a million people dead was the work of the fungus *Phytophthora infestans*, which wiped out the country's staple potato crop.

While fungal diseases are common among plants, only a very small fraction of them assail humans. One reason is that animals, including humans, have evolved intricate immune systems.

However, when the immune system has been breached by another illness, fungi that are otherwise harmless take advantage and invade human tissues. These are called opportunistic infections. Even so, unlike their pathogenic bacterial counterparts, fungi rarely cause life-threatening diseases.

Mycology :

The zygomycoses are infections caused by fungi of the class *Zygomycetes*, comprised of the orders *Mucorales* and *Entomophthorales*. The *Entomophthorales* are rare causes of subcutaneous and mucocutaneous infections known as entomophthoromycosis, which largely afflict immunocompetent hosts in developing countries. In contrast, fungi of the order *Mucorales* are causes of mucormycosis, a life-threatening fungal infection almost uniformly affecting immunocompromised hosts in either developing or industrialized countries.

Fungi belonging to the order *Mucorales* are distributed into six families, all of which can cause cutaneous and deep infections. Species belonging to the family *Mucoraceae* are isolated more frequently from patients with mucormycosis than any other family. Among the *Mucoraceae*, *Rhizopus oryzae* (*Rhizopus arrhizus*) is by far the most common cause of infection.

Sources of Mucoralean Fungus :

The Mucoralean fungi are even less problematic. They include the genres of *Mucor* and *Rhizopus*. These are ubiquitous molds occurring in the soil, compost, animal dung, rotting wood and plant material. They are seen as the black growth on old fruits and bread. Mucoralean fungi are generally the first colonisers of dead or decaying plant material. They rapidly utilise the

limited amount of simple carbohydrates available before other fungi show up for the more complex carbohydrates, such as cellulose.

As it happens, hospitals are not free from these spores. A study in Tehran in 2014 suggested that hospital air could carry many opportunistic pathogenic fungi like *Candida*, *Aspergillus*, *Penicillium* and *Rhizopus*.

Pathogenesis of Mucormycoses :

Like most fungi, *Mucor* produces millions of microscopic spherical, dark-hued structures called spores, which are dispersed in air. When the spores land on moist surfaces, like soil or plant material, they begin to germinate and produce thread like structures called mycelia. The mycelia branch out and feed on sugars in their surroundings and grow.

Fungal spores measure one thousandth to one hundredth of a millimeter. The density of the spores – the number of spores per cubic metre of atmosphere – varies depending on the fungus, the location (vegetation and exposed earth) and season. In tropical areas like in India, spore counts are generally higher during the summer than during the monsoons. But compared to the 1,000-5,000 spores per cubic meter outdoors, the count inside homes is typically 100-250 only. Five to 10 species account for more than 90% of the total spore density in the air.

Rhino-orbital-cerebral and pulmonary mucormycosis are acquired by the inhalation of spores. In healthy individuals, cilia transport these spores to the pharynx and they are cleared through the gastrointestinal tract. In susceptible individuals, infection usually begins in the nasal turbinates or the alveoli. **The agents of mucormycosis are angioinvasive; thus, infarction of infected tissues is a hallmark of invasive disease.**

Rhizopus organisms have an enzyme, ketone reductase, which allows them to thrive in high glucose, acidic conditions. Serum from healthy individuals inhibits growth of *Rhizopus*, whereas serum from individuals in diabetic ketoacidosis stimulates growth.

Deferoxamine, which chelates both iron and aluminum, increases the risk of mucormycosis by enhancing growth and pathogenicity. The deferoxamine-iron chelate, called feroxamine, is a siderophore for the species *Rhizopus*, increasing iron uptake by the fungus, which stimulates fungal growth and leads to tissue invasion.

Risk factors :

The frequency of mucormycosis infections has increased in the last decade, principally because of the greater number of organ transplants. People who have received transplanted organs depend on

immunosuppressant drugs to keep their bodies from rejecting the new organs, but in this state they are also predisposed to infection.

People suffering from COVID-19, HIV/AIDS and other viral diseases, congenital bone marrow disease, severe burns, cancers and untreated or irregularly treated diabetes have reduced immunity and are prone to developing mucormycosis. COVID-19 patients who have received steroids are particularly at risk because steroids suppress the immune system.

- Uncontrolled Diabetes, especially with diabetic ketoacidosis
- Cancer
- Organ transplant
- Stem cell transplant
- Neutropenia
- Iron overload
- Long-term corticosteroid use or injudicious use of Tocilizumab
- Injection drug use
- Skin injury due to surgery, burns, or wounds
- Prematurity and low birthweight (for neonatal gastrointestinal mucormycosis)

Mucormycosis IS NOT CONTAGEOUS and can not spread from person to person

Symptomatology :

Depending upon the system involved, mucormycosis may be classified into:

1. Rhinocerebral
2. Pulmonary
3. Cutaneous
4. Gastro-intestinal
5. Disseminated

Devastating rhino-orbital-cerebral and pulmonary infections are the most common syndromes. The fungus invades the sinus and makes its way into the intraorbital and intracranial regions. If its progression is not checked early, 50-80% of patients could die.

Symptoms of **rhinocerebral (sinus and brain) mucormycosis** include:

- One-sided facial swelling
- Headache
- Nasal or sinus congestion
- Black lesions on nasal bridge or upper inside of mouth that quickly become more severe
- Fever

The infection usually presents as acute sinusitis with fever, nasal congestion, purulent nasal discharge, headache, and sinus pain. All of the sinuses become involved, and spread to contiguous structures, such as

the palate, orbit, and brain, usually progresses rapidly over the course of a few days.

The hallmarks of spread beyond the sinuses are tissue necrosis of the palate resulting in palatal eschars, destruction of the turbinates, perinasal swelling, and erythema and cyanosis of the facial skin overlying the involved sinuses and/or orbit. A black eschar, which results from necrosis of tissues after vascular invasion by the fungus, may be visible in the nasal mucosa, palate, or skin overlying the orbit..

Signs of orbital involvement include periorbital edema, proptosis, and blindness. Facial numbness is frequent and results from infarction of sensory branches of the fifth cranial nerve. Spread of the infection from the ethmoid sinus to the frontal lobe results in obtundation. Spread from the sphenoid sinuses to the adjacent cavernous sinus can result in cranial nerve palsies, thrombosis of the sinus, and involvement of the carotid artery. Hematogenous spread to other organs is rare unless the patient has an underlying hematologic malignancy with neutropenia.

Symptoms of **pulmonary (lung) mucormycosis** include:

- Fever
- Cough
- Chest pain
- Shortness of breath

Cutaneous (skin) mucormycosis can look like blisters or ulcers, and the infected area may turn black. Other symptoms include pain, warmth, excessive redness, or swelling around a wound.

Symptoms of **gastrointestinal mucormycosis** include:

- Abdominal pain
- Nausea and vomiting
- Gastrointestinal bleeding

Disseminated mucormycosis typically occurs in people who are already sick from other medical conditions, so it can be difficult to know which symptoms are related to mucormycosis. Patients with disseminated infection in the brain can develop mental status changes or coma.

Diagnosis :

The presence of mucormycosis should be suspected in high-risk patients, especially those who have diabetes and metabolic acidosis and who present with sinusitis, altered mentation, and/or infarcted tissue in the nose or palate. A clinician must think of this entity in the appropriate clinical setting and pursue invasive testing in order to establish a diagnosis as early as possible.

Endoscopic evaluation of the sinuses should be performed to look for tissue necrosis and to obtain specimens.

Bony erosions can be seen easily on **CT scan** also and may be used as first line of diagnosis. However, **MRI** will enhance detection of intracranial, intraorbital, and cavernous sinus involvement.

The diagnosis of mucormycosis relies upon the identification of organisms in tissue by histopathology with culture confirmation. However, culture often yields no growth, and histopathologic identification of an organism with a structure typical of Mucorales may provide the only evidence of infection.

The diagnosis of pulmonary mucormycosis is difficult because the presentation does not differ from pneumonia due to other angioinvasive molds. Isolating an agent of mucormycosis from respiratory cultures in a high-risk patient with a compatible clinical presentation is an indication for starting empiric treatment.

Prevention :

There are a few simple steps we can follow to lower our risk of contracting mucormycosis.

Public education

Judicious use of short term steroids during Covid treatment

Judicious use of immunosuppressants like Tocilizumab during Covid treatment

Intensive glycemic control of Covid patients especially when on steroids

Periodically sample the air in hospitals, especially in the critical care wards, to check for the presence of spores.

Must ensure that the humidifiers used during oxygen therapy are sterile.

Recovering patients should be advised to remain indoors until they regain their natural strength and immunity. Patients should be instructed to avoid areas with a lot of dust like construction or excavation sites

- Patients engaged in farming or gardening should be advised to lay off from work until the storm has settled. If it is a must, they should wear shoes, long pants, and a long-sleeved shirt when doing outdoor activities such as gardening, yard work, or visiting wooded areas.

Management :

Intensive control of glycemia with Insulin infusion is of utmost importance.

Surgical debridement of infected tissue with proper antifungal treatment by a team of consultants involving a faciomaxillary surgeon, Physician, Nephrologist, Pulmonologist and ENT surgeon is the main hall mark of management.

Recent data support the concept that high-dose

liposomal amphotericin is the preferred monotherapy for mucormycosis. The two drugs most effective at treating mucormycosis are amphotericin B and posaconazole – provided the infection is found early. However, the latter is hard to do because we don't know of a reliable diagnostic feature of mucormycosis.

Step down treatment with Posaconazole and isavuconazole are broad-spectrum azoles that are active in vitro against the agents of mucormycosis and that are available in both parenteral and oral formulations.

It is now clear that iron metabolism plays a central role in regulating mucormycosis infections and that deferoxamine predisposes patients to mucormycosis by inappropriately supplying the fungus with iron. These findings raise the possibility that iron chelator therapy may be useful to treat the infection as long as the chelator does not inappropriately supply the fungus with iron.

However, several novel therapeutic strategies are available. These options include combination therapy using lipid-based amphotericin with an echinocandin or with an azole (largely itraconazole or posaconazole) or with all three. The underlying principles of therapy for this disease remain rapid diagnosis, reversal of underlying predisposition, and urgent surgical debridement.