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From Editor's Desk...

Spring is in the air, with its fresh air, the barren branches of trees which looked lifeless are again bursting forth with life – fresh leaves & flowers. This beautiful phenomenon occurs regularly at this time every year & therefore we sometimes take it for granted.

Hyper – Baric Oxygen Treatment started at Godrej Memorial Hospital on 23rd February, 2010, has revived / resurrected & repaired many a limb and life which would have been mistakenly or otherwise chopped off or withered.

In various conditions where tissues are deprived of the 'Vital force' of life giving / supporting Oxygen (Pran Vayu) this wonderful non-invasive therapy can be a great boon & saviour.

In this issue we feel obliged & previleged to tell you about this therapy so that you can avail of it or make your near & dear ones aware of it.

We have successfully treated many patients & given them a better quality of life. Some of the cases are almost miraculous & wonderful. You may read them in this issue.

So... happy reading & breathing.

Dr. Kanishka Kapasi
MD, DGO
Godrej Memorial Hospital

Hyperbaric Oxygen Treatment (HBOT)

Godrej Memorial Hospital is committed to provide Quality Healthcare services. It is one of the few hospitals in the country, accredited by the Quality Council of India (QCI), through award of NABH (National Accreditation Board for Hospital & Healthcare providers) & NABL (National Accreditation Board for Medical Laboratories) certifications.

The Hospital is the first commercial hospital in Mumbai to have commissioned a unique department of Hyperbaric & Diving Medicine along with a six man Multiplace Recompression Chamber. Such facilities are only available at few specialised centres across the Asia Pacific region.

Six Man Chamber at GMH

The twin-lock Mulitiplace Recompression Chamber has a six patient (two lying & four sitting) seating capacity with separate space for chamber attendant. The chamber is capable of being pressurised to 6 ATA, thus simulating a dive to sea water depth of 50 meters. Enriched air, 100 % Oxygen or other breathing mixtures are made available to personnel inside by mask / hood through BIBS (Built in Breathing System). State of the art instrumentation allows strict monitoring & control of chamber microclimate (temperature, humidity, pressure & gases including pollutants) and physiological parameters of individuals inside (Temperature, Pulse, Respiration, Blood Pressure, 12 lead ECG, Pulse Oximetry).

The chamber complex is being used in the clinical settings to impart Hyperbaric Oxygen Treatment (HBOT) to patients including treatment of diving casualties.

History of Hyperbaric Oxygen Therapy

The use of hyperbaric therapy dates back nearly 350 years. The first hyperbaric chamber was created in 1662 by British physician Henshaw. He discovered that chronic illnesses benefited from reduced pressure while acute illnesses responded better to increased pressures. In 19th century Europe saw the use of pneumatic institutes that increased pressure by at least 2 atmospheres and were used as a type of spa treatment.

It was not until over a century later in 1788, that compressed hyperbaric air was put to large scale use in a diving bell for underwater industrial repairs of an English bridge. The first deep sea diving suit, invented in 1819 by August Siebe, used compressed air supplied to the helmet for generous underwater movement.

In 1878 Paul Bert, a French physiologist, discovered the link between decompression sickness and nitrogen bubbles. He also discovered that the pain from decompression sickness could be reversed with recompression.

In 1879 Fontaine, a French surgeon, developed a mobile pressurized operating room. This had two benefits. First, inhaled nitrous oxide became more potent and resulted in deeper anesthesia. Secondly, the patients had improved oxygenation.

Never judge from ignorance, ego or emotion. Always judge from evidence & exprience .... kaydee

Crush injuries, compartment syndrome and other traumatic ischaemias represent a spectrum of injury to body parts as result of trauma. Presentations vary from minor contusions to limb threatening damage. Typically, the injury involves multiple tissues from skin and subcutaneous to muscle and tendons to bone and joints. In their most severe presentations, predictable complications including osteomyelitis, non union of fractures, failed flaps and amputations occur in approximately 50 percent of the cases with "standard of practice" surgical and medical interventions.

HBOT supplements oxygen availability to hypoxic tissues during the early post injury period when perfusion is most likely to be inadequate. Hyperbaric oxygen exposures at two atmospheres absolute (ATA) increase the blood oxygen content by 125 percent. The oxygen tensions in plasma as well as tissue fluids is increased 10-fold (1000 %). Sufficient oxygen can be physically dissolved in plasma under HBOT conditions to keep tissues alive without hemoglobin-borne oxygen. Increased tissue oxygen tensions result in a three-fold "driving force" (mass effect) for oxygen to diffuse through tissue fluids. This helps to compensate for the hypoxia resulting from the increased oxygen diffusion distance from the capillary to the cell through the surrounding edema.

Dr. John S. Haldane studied the effects of compressed oxygen and taught at the University of Dundee in the early 1900's. He developed the first diving tables for the Royal Navy. His legacy gives him the title "Father of Oxygen Therapy" and physicians continue in his line of work to this day.

In 1918 Dr. Orval Cunningham had an 8' diameter by 30' long hyperbaric chamber built next to his medical clinic (see picture). His good outcomes with patients suffering from pneumonia encouraged him to build other chambers. He built the world's largest functional hyperbaric chamber, a 64' steel sphere "hyperbaric medical hotel" with five floors of living space.

What is HBOT : HBOT is the use of 100% oxygen at pressures greater than atmospheric pressure. The patient breathes 100% oxygen intermittently while the pressure of the treatment chamber is increased to greater than 1 atmosphere absolute (ATA). Though the use was propagated as early as 1620, the modern day use with research for clinical evidence started in 1955. At present 14 conditions are approved by Undersea & Hyperbaric Medical Society (UHMS), a peer body followed by the world medical community.

Oxygen Through BIBS

Administration of HBOT : HBOT is administered inside chambers that are pressurised using air or oxygen to pressures more than atmospheric. Broadly, there are two types of chambers, multiplace which can hold more than one patient and monoplace chambers designed to cater for a single patient. Multiplace chambers use masks or hoods to administer oxygen to the patient and are more suitable for management of critical patients. Monoplace chambers can be directly flooded with Oxygen. Most therapy is given at 2 or 3 ATA and the average duration of therapy is 60-90 min. Number of therapies may vary from 5 to 10 for acute conditions to 50-100 for chronic illnesses.

Oxygen Through Hood

Mechanism of Action : HBOT has two primary mechanisms of action, hyperoxygenation and a decrease in bubble size. Hyperoxygenation is an application of Henry's law and results from an increase in dissolved oxygen in plasma as a result of increased partial pressure of arterial oxygen. A pressure of 3 ATA results in 6.8 ml of O2 being dissolved per 100 ml of plasma, making haemoglobin bound O2 reduntant.

Decrease in bubble size is an application of Boyle's law according to which the volume of a bubble decreases directly in proportion to increasing pressure and is the primary mechanism at work in management of decompression sickness and arterial gas embolism.

Secondary mechanisms of action include vasoconstriction, **angiogenesis, fibroblast proliferation, leukocyte oxidative killing, toxin inhibition and antibiotic synergy.** Hyperoxia in normal tissues causes vasoconstriction which reduces post-traumatic tissue oedema, contributing to the treatment of crush injuries, compartment syndromes and burns. This vasoconstriction, however, does not cause hypoxia as this is more than compensated by increased plasma oxygen content and microvascular blood flow.

Oxygen is vital for hydroxylation of lysine and proline residues during collagen synthesis and for cross linking and maturation of collagen which is required for strong wound healing.

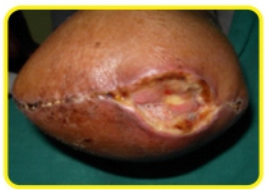
Diabetic Foot represent a significant and growing challenge to our healthcare system. Venous leg ulcers and pressure ulcers are the most common lower extremity wound seen in ambulatory wound care centers with recurrences frequent and outcomes often less than satisfactory. Foot ulcers in patients with diabetes contribute to over half of lower extremity amputations.

Hyperbaric oxygen treatment offers an intriguing opportunity to maximize oxygen delivery and ultimately to increase wound blood flow via neovascularization in the setting of minimal or insufficiently corrected blood flow.

The net result of serial hyperbaric oxygen exposures is improved local host immune response, clearance of infection, enhanced tissue growth and angiogenesis leading to progressive improvement in local tissue oxygenation and healing of hypoxic wounds.

HBOT increases the oxygen gradient between the centre and periphery of the wound, thus creating a strong angiogenic stimulus. This along with fibroblastic proliferation leads to increased neovascularisation.

HBOT increases the generation of oxygen free radicals, which oxidise proteins and membrane lipids, damage DNA and inhibit bacterial metabolic functions leading to the detrimental effects on cell membranes, proteins and enzymes especially anaerobes. HBOT further inhibits clostridial toxin production and improves potency of antibiotics like Fluoroquinolones, Amphotericin B and Aminoglycosides, all of which use oxygen for transport across cell membranes.



Approved Indications : The present accepted conditions supported by Medical Insurance are:-

- Arterial Gas Embolism
- Carbon monoxide poisoning
- Gas gangrene (clostridial myositis)
- Crush injury, compartment syndrome and other acute traumatic ischemias.
- Delayed radiation injury (bony & soft tissue)
- Enhancement of healing in problem wounds.
- Exceptional blood loss anaemia
- Intracranial abscess
- Necrotizing soft tissue infections
- Osteomyelitis (Chronic, refractory)
- Decompression illness
- Skin grafts and flaps (compromised)
- Thermal burns.
- Central Retinal Artery Occlusion.
- Acute Sensineural Hearing Loss

Apart from the approved indications, a number of areas are being explored to determine if HBOT might be of some clinical benefit. These areas include stroke, multiple sclerosis, sports injuries, high altitude illness, myocardial infarction, brain injuries, head injuries and enhancement of survival in free flaps.

Contraindications : The absolute contraindication for HBOT is the presence of an untreated pneumothorax as compression and decompression during HBOT could lead to development of tension pneumothorax and gas emboli.

Relative contraindications include claustrophobia, asthma, chronic obstructive pulmonary disease (COPD), pregnancy, congenital spherocytosis, upper respiratory tract infection or any other Eustachian tube dysfunction, fever, pacemaker in situ and seizures/epilepsy.

Complications : When used in standard protocols, HBOT is safe. The most common complication during HBOT is barotraumas, usually of the middle ear. For an unconscious patient, myringotomy may be done to prevent middle ear barotrauma. Other organs affected by barotrauma are external and inner ear, air sinuses, GI tract and tooth cavities. Rare cases of acute CNS oxygen toxicity can be caused. Development of reversible myopia and clouding of pre-existing cataracts are other rare complications of HBOT.

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Suggestions & feedback @ hospital@godrej.com

GODREJ INTERVENTIONAL NEUROLOGY & INTERVENTIONAL RADIOLOGY CENTRE

COMING SOON

Neurology

- Carotid Angiography/Cerebral Angiography
- Carotid Artery Stenting
- Aneurysm/AVM Coiling Embolization
- Emergency Stroke (Paralysis) Treatment

Oncology

- Liver/Renal Embolization
- Catheter Guided Chemotherapy (TACE)

COMING SOON

GODREJ CARDIAC HEALTH CARE CENTRE

Interventional Cardiology

- Coronary Angiography (CAG)
- PCI - Percutaneous Coronary Intervention
- Percutaneous Transluminal Coronary Angioplasty (PCTA)
- Coronary Stenting - medicated, non-medicated and bio-absorbable stent implantation
- Pacemaker Implantation
- Valvuloplasty
- Procedures for congenital heart disease like ASD, VSD, PDA

Vascular

- Peripheral angiography and angioplasty
- Renal angiography and angioplasty
- IVC filter placement
- GI bleeding, Haemoptysis
- Endovenous laser ablation for varicose veins
- Endovascular aortic repair
- Uterine Artery Embolization (UAE)
- Transjugular Intrahepatic Portosystemic Shunt (TIPS)

COMING SOON

Cardiac Surgery

- CABG (Bypass), MIS, Beating heart and on pump
- Valve replacement

COMING SOON

VALUE HEALTHCARE FOR ALL

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