2019

Safety Manual/Monthly Safety Awareness Program

SerenaGroup
building the nation's leading wound care team.

SerenaGroup Hyperbaric Medical Center
2019

Fire Safety Plan

1. Purpose

To provide hyperbaric personnel a predetermined plan in the event of a fire in the hyperbaric area in order to reduce injury and/or catastrophic outcomes.

2. Policy

2.1. In the event of an emergency, the Hyperbaric Medicine Center personnel will be prepared to respond.

2.2. The Safety Director shall be designated by the Program Director / Manager or designee.

NOTE: NFPA 99 Health Care Facilities, 1999 edition, (page 131)

"19-3.1.3.2 A safety director shall be designated in charge of all hyperbaric equipment. The safety director shall work closely with facility management personnel and the hyperbaric physician(s) to establish procedures for safe operation and maintenance of the hyperbaric facility. He or she shall make necessary recommendations for departmental safety policies and procedures. The safety director shall have the authority to restrict or remove any potentially hazardous supply or equipment items from the chamber."

2.3. Each plan shall be collaboratively developed with the hospital fire safety policy in conjunction with NFPA standards.

2.4. There will be no smoking or open flames in the hyperbaric area.

2.5. The area will be kept exceptionally clean and free of fire hazards according to the NGPA for Hyperbaric health care facilities.

2.6. The chamber itself will be kept exceptionally clean of lint and dust particles as these are hazardous when inside the chamber.

2.7. Each hyperbaric patient will be searched and questioned about possession of an ignition source before entering the chamber.

2.8. All items listed in the chamber safety policy will not be allowed in the chamber.

3. Scope

Applies to all Hyperbaric Medicine Center staff and patients.

4. Responsibility

It is the responsibility of the Safety Director for the center to implement and ensure that fire safety practices are followed within the department.

5. Procedure

5.1 The Program Director/Manager shall obtain the hospital fire safety plan.

5.2 A comprehensive plan will be developed and incorporated into the overall emergency plan for the center. It shall include the following at a minimum:

5.4.1 Signage locations

5.4.2 Extinguishing (sprinklers, smoke detectors, fire extinguishers, etc.) methods, equipment and location.

5.4.3 R.A.C.E. protocol or similar standard guideline for response in the event.

5.4.4 Emergency phone numbers-who to contact, when and where.

5.4.5 Oxygen leak testing-frequency and procedure.

5.4.6 Electrical equipment-location, preventive maintenance schedule

5.4.7 HBO requirements for fire prevention

5.4.8 Mock drill-frequency

5.4.9 General response to fire-code announcement, door and window handling

5.3 All Oxygen-8 Hyperbaric Medicine Centers personnel will be knowledgeable of the fire safety plan and be prepared to proactively prevent fire and in the case of a fire, extinguish it immediately.

5.4 Assure appropriate signage (readable from a distance of 5 feet) in the center prohibiting smoking.

5.4.1 Ensure patients, staff and visitors do not smoke or have any open flames within the center.

5.5 Ensure the patient has changed into 100% cotton clothing prior to the therapy. **CLOTHING DISALLOWED IN THE CHAMBER INCLUDE THE FOLLOWING:**

5.5.1 Underwear (bra, panties, briefs)

5.5.2 Street clothes (even if tag states 100% cotton)

NOTE: These items are potential sources of ignition as well as a place for concealment of lighters or matches.

5.6 Ensure all linens are 100% cotton. This includes pillow cases, blankets, and sheets.

5.7 Search all patients prior to initiation of every treatment to secure that no lighters or matches, jewelry etc. are being placed in the oxygen enriched environment. (Wedding bands may be taped if patient refuses to remove).

5.8 Cleanse or allow the patient to cleanse off the following petroleum based products:

- Make-up
- Hair spray
- Nail polish

- Perfume
- After shave lotion
- Oil-based creams/ointments (petroleum jelly), or cover wound or skin area with 100% cotton linen.

5.9 Allow only the items necessary for patient care during therapy such as:

- NG tubes (vented)
- External fixation devices covered with cotton towels
- Wound Dressings
- Soft contacts
- Foley catheters, auto vented
- Other drains or catheters, vented
- Monitoring leads and cables compatible with the chamber such as pass through lines for EKG or TCOM monitoring
- Intrinsically safe transducers

NOTE: Cover all dressings with 100% cotton linens.

NOTE: If patient has a post-op skin graft and physician does not want the dressing removed, cover existing dressing with 100% damp cotton towel. NEVER expose a wound covered with an ointment in the chamber.

5.10 Disallow the following items in the chamber:

- External pacemakers
- Holter monitors
- External TENS or similar product
- External insulin pump

5.11 Turn off the main oxygen supply to the chambers at the end of each day to ensure no leakage of oxygen into the room.

5.12 Analyze the oxygen concentration in the room around the gaskets of the chamber and various sites in the room to ensure no leakage of oxygen is occurring, according to policy.

5.13 Sign off on the pretreatment checklist before every HBO therapy.

5.14 **FIRE OUTSIDE OF CHAMBER AREA BUT INSIDE THE BUIDLING**

5.14.1 Follow hospital fire plan

5.15 **FIRE IN THE HYPERBARIC UNIT BUT OUSIDE OF THE CHAMBER**

5.15.1 Pull fire alarm and activate hospital fire plan informing of location of the fire

5.15.2 Notify patients of need for rapid decompression.

5.15.3 “Emergency vent” the chambers and remove patients from chambers.

5.15.4 Turn off oxygen.

5.15.5 Assist in the evacuation of the area per hosptial evacuation plan

5.16 **FIRE INSIDE OF THE HYPERBARIC CHAMBER**

5.16.1 Notify other staff members to pull fire alarm and activate hospital fire plan informing of location of the fire

5.16.2 “Emergency vent” the chambers and remove patients from chambers.

5.16.3 Have patient breathe from the air break mask during emergency ventilation.

5.16.4 Turn off oxygen.

5.16.5 Prepare to extinguish fire.

5.16.6 Assist in the evacuation of the area per hosptial evacuation plan

Emergency Preparedness

1. Purpose

To establish an Emergency Preparedness plan specific for the hyperbaric center.

2. Policy

2.1. To provide optimal patient care and support in the event of an emergency such as fire, flood, hurricane, ice storm, earthquake, tornado, etc.

2.2. All patients will be oriented in alternative care options

2.3. All staff will be oriented and updated to the emergency preparedness plan with safety as a primary focus

2.4. The Hyperbaric Medicine Center Emergency Preparedness plan compliments the hospital's plan; it does not supersede the hospital emergency preparedness plan.

3. Scope and Responsibility

Applies to all members of the Hyperbaric Medicine Center.

4. Procedure

4.1. Should it become necessary to remove patients from the chambers, the following actions should be taken:

4.1.1. Explain to the patients why they are being decompressed.

4.1.2. Decompress chambers at a normal rate. **DO NOT EMERGENCY VENT THE CHAMBERS**.

4.1.3. Provide alternative care information to the patient on admission that instructs the patient on the plan for care in the event of a natural disaster.

4.1.4. Once chambers are empty and all of the patients have exited the center, secure the chambers in the following manner:

4.1.4.1. Close the doors on the chambers

4.1.4.2. Switch off both the Oxygen and Air supply to the chambers at the wall source.

4.1.4.3. Disconnect the transformer from the electrical outlet at the wall. The will interrupt the supply power to the battery charger.

4.1.4.4. Cover the chambers with the cloth chamber cover.

2019 Safety Program Schedule

January – Sinus Blockage

February – Static Electricity

March – Gas Contamination

April – Power Failure

May – Gas Supply Failure

June – Pneumothorax Under Pressure

July – Emergency Decompression

August – Cardiac/Respiratory Arrest

September – Confinement Anxiety/Claustrophobia

October – Ear Barotrauma

November – Fire Safety

December – Seizures in the Hyperbaric Chamber

Call in Number : See monthly email

Sinus Blockage

Overview: This type of blockage is much more difficult to treat because you have no surgical intervention such as PE tubes. This type of blockage is not as common as the blocked ears. The frontal sinus is extremely sensitive to barotrauma and the pain is severe. If the blocked sinus can not be cleared by the use of oral decongestants or nasal sprays then the patient will need to see and ENT.

Procedure: If the patient has a sinus blockage the physician may order an oral decongestant or vasoconstrictive nasal spray. Consult ENT if these medications don't relieve the pressure.

Reference: Eric P. Kindwall, Hyperbaric Medicine Practice, pp.287

Date:_____

Name:_____

Post-Test
Sinus Blockage

1. Sinus Blockage can be treated by a myringotomy.
   (circle) True False

2. If the blocked sinus can not be cleared a _____ consult should be ordered.

3. _____ and _____ can be ordered to help clear the blocked sinus.

4. The frontal sinus is extremely sensitive to barotrauma. (circle) True False

5. Sinus Blockages are very common during compression. (circle) True False

Static Electricity/Grounding

Overview: When oxygen concentration increases in an atmosphere, the risk of fire increases. Sparks caused by discharges of static electricity have been implicated as ignition sources in fires and explosions. To prevent fires in any environment the 3 legs of the fire triangle must be considered, fuel, ignition source and oxygen. Fire prevention in hyperbaric environments focuses on reducing the amount of available fuel and eliminating the source ignition. The majority of fires in Hyperbarics have been caused by the introduction of an ignition source (hand warmers, cigarette lighters, etc.) Static electricity is a routine part of our lives. We have all experienced a snap or pop of static when you reach for a doorknob, particularly after walking across a carpeted floor. In certain situations a static discharge can lead to disaster. Electrons accumulate on the surfaces of objects (including our body) and can result in significant voltage potentials under certain conditions. These voltages usually flow unnoticed from object to object through conductive pathways. To reduce the potential for sparks, static charges must have conductive pathways to flow through and these are called grounds. Ground examples are: conductive footwear, cables, chains or elevated relative humidity levels (>40-50%) can provide an appropriate path to ground in order to dissipate the accumulated charge. There are specific grounding requirements for Hyperbaric Chambers and occupants defined in the National Fire Prevention Agency Manual (NFPA) Chapter 19, NFPA 99 or Chapter 20, NFPA 02. Requirements state that a grounding system must provide a high impedance conductive pathway in contact with the patient's skin. Grounding straps used in hyperbaric chambers are usually attached to the patient's wrist or to an adhesive ECG monitoring pad. The Hyperbaric environment poses an increased fire hazard primarily due to elevated oxygen concentration. It would be extremely rare to see the discharge of more than a single spark especially if the patient was properly grounded.

Procedure: Daily inspection of your hyperbaric chamber includes the inspection of the grounding wire attached at the rear of your chamber. All patients are required to wear a grounding wrist band or ECG patch before entering the chamber. Grounding Areas: **chamber** (cable is attached to grounding plate upon daily inspection) **patient** (wrist band or ECG patch attached) **gurney** (chain at bottom of gurney making contact with the floor). To safely treat patients in an increased oxygen environment we must pay close attention to static control by increasing relative humidity and providing adequate conductive pathways as listed above.

References: NFPA 99, Chapter 19 Section 2.7.4, 3.1.5.3, NFPA 03, Chapter 20 Section 20.2.7.4, 20.3.1.5.3.2, Wilbur T. Workman, Hyperbaric Facility Safety: A Practical Guide, Chapter 3, pp 523-533

Date:_____

Name:_____

Post-Test
Static Electricity/Grounding

1. A static spark does not generate enough charge to be dangerous in an oxygen enriched environment. (circle) True False

2. Give two examples grounding used in the HBO department_____ and _____.

3. To decrease static electricity you may need lower your humidity in the chamber room. (circle) True False

4. This_____ grounding area is inspected prior to treating your first patient of the day.

5. The_____ Manual gives you specific grounding requirements.

6. If your patient is grounded it is extremely rare to have a static spark. (circle) True False

7. The human body is capable of producing significant voltage potential under the certain conditions. (circle) True False

8. The majority of fires in HBO chambers have been caused by _____ source.

9. The 3 legs of the fire triangle are:_____, _____ and _____.

10. When the concentration of oxygen is increased so does the risk of fire. (circle) True False

Gas Contamination

Overview: **Oxygen -** your hospital will have a Test Protocol for regularly testing the purity of the hospital oxygen. Request a copy of the hospital's protocol to place in your safety manual.

Air - supplied by an H cylinder delivers the air required for the hyperbaric patient's air break. You can assure the purity of the air being delivered to your patient by receiving a copy of your Gas Distributors Quality Assurance Log Book.

Procedure: If the purity of the gas being utilized is in question, notify Facility Services, Nurse Manager and the Safety Officer of the occurrence. The following steps should be taken to insure purity of the gas being delivered to your patient.

Oxygen - The oxygen is checked for concentration and gaseous purity at each outlet and particulate contamination at least once each zone valve. Other points checked are: alarms, temperature, shut-off valves, flow, leakage, pressure, and proper installations (i.e. Brazing, Labeling, and Hanging).

Air - All cylinders have a lot number. This can be found on the top portion of your cylinder. The lot number may resemble these types of characters K8723213. Contact your oxygen/air supplier with the lot number of your tank, they will pull their Quality Assurance Record on that particular lot which include the following information: Location, Date, Lot Number, Cylinder/ID#, Grade, Analyze, Test Equipment, Test Results, Tester, Test Date, Released By and Release Date.

References: Praxair, Telephone 614-443-7687 (place the number for your Oxygen supplier) Director of Facility Services (place the name and number of your contact here).

Date:_____

Name:_____

Post-Test
Gas Contamination

1. There is no true way to test the purity in your H cylinder.
   (circle) True False

2. Your H cylinder will have a _____number on it for tracking.

3. Your hospital will have a record of the procedure for testing the purity of the oxygen going to the chamber. (circle) True False

4. The Air Cylinder is yellow. (circle) True False

5. The purity of the oxygen is usually tested at each _____valve.

6. List two items that are inspected when the hospital checks for oxygen purity.
   _____ and _____.

Power Failure

Overview: **Sechrist –** The Pneumatic Pressure Control System is non-electronic and operates from the gas supply pressure. A standard 110 volt, 60 Hz wall socket must be provided, this operates the intercom system. In case of a power failure the intercom will operate on a back-up battery.

Sigma 34/Sigma Plus – The gas control system pressurizes, ventilates and depressurizes the chamber within preset parameters. The system operates totally on pneumatic logic and does not require electricity. The Perry communications system operates normally on a AC voltage input range of 120 volts at 60 Hertz or 240 volts at 50 Hertz. In the event of a AC power failure the communications unit will continue to operate for a limited time.

ETC Bara-Med – The Chamber is equipped with a redundant back up power system and will operative in a normal fashion with no action necessary on the part of the operator. The ETC communications system operates normally on a AC voltage input range of 120 volts at 60 Hertz or 240 volts at 50 Hertz. In the event of a AC power failure the communications unit will continue to operate for a limited time.

Procedure: A power outage will not interrupt treatment. The chamber is gas powered and the communication system has a battery back-up. If power has not been restored within 10 minutes abort the treatment and decompress the chamber at a normal rate. Hold treatments until situation is corrected.

Reference: Sechrist pp. 1.2, 2.6, 4.4, Sigma 34 pp. 14, 18, Sigma Plus pp.17, ETC BARA-Med manual chapter 7 pp 8

Date:_____

Name:_____

Post Test
Power Failure

1. Loss of electricity will cause the chamber to malfunction.
   (circle) True False

2. The Hyperbaric Chamber is _____ powered.

3. The _____ is powered by electric and will continue to operate during a power failure.

4. The chamber is equipped with a battery back-up.
   (circle) True False

5. Installation of the chamber needs to be located by a power source.
   (circle) True False

Gas Supply Failure

Overview: The Sechrist and Perry Chamber are gas pressurized. Loss of pressure to the chambers will automatically decompress the chamber.

Procedure: **Sechrist**

Set the Set Pressure Gauge to zero

1. Turn the Master Valve to the off position. The chamber will automatically decompress at a rate of approximately 3-5 psi per minute.
2. When the Chamber Pressure Indicator shows black, open the chamber door and remove the patient.

Sigma 34/Sigma Plus

1. Depressurization will begin immediately when loss of supply pressure occurs.
2. Flip the system on/off switch to the off position.
3. Adjust the rate of depressurization with the Ventilation Control Valve; turn the control valve fully clockwise to the minimum setting.
4. When chamber reaches zero open the door.

ETC Bara-Med

1. Switch the supply to a secondary source if available. (if not step 2)
2. Press the end treatment button (if in Auto mode)
3. (If in manual mode) Close the Manual Pressure Control valve
4. Depressurize the chamber with the Manual Vent Control valve

References: Sechrist Manual 4.10, Perry Sigma 34 Manual pp.34, Sigma Plus Manual pp. 28 ETC BARA-Med manual chapter 7 pp 8

Date:_____

Name:_____

Post-Test
Gas Supply Failure

1. The Sechrist and Perry Chambers are gas powered.
   (Circle) True False

2. The chamber will _____ decompress when we have loss of gas pressure.

3. If you lose electrical power the chamber will automatically decompress the patient. (circle) True False

4. When the patient reaches the surface you will proceed with normal operation procedures for removing the patient, such as waiting for the chamber to reach zero or the indicator eye to turn black. (circle) True False

Pneumothorax Under Pressure

Overview: A pneumothorax in the chamber is extremely serious. Symptoms suggesting pneumothorax include sudden shortness of breath, stabbing chest pain, tracheal shift, asymmetric chest movement, and increased respiratory distress during decompression. If a pneumothorax is suspected, a 14-16 gauge needle should be readily available prior to decompression. Upon exiting the chamber, additional findings may be present on physical exam. These include asymmetric breath sounds, hypotension and tachycardia. Perform an immediate needle decompression if the patient appears to have a "tension" pneumothorax as evidenced by significant tachycardia, hypotension, or respiratory distress. Decompression is performed by inserting a 14 or 16 gauge needle over the top of the 2nd rib at the midclavicular line.

Procedure: If patient exhibits any of the above symptoms, do the following:

- Stop decompression
- Notify Hyperbaric Physician
- If it is determined that the patient does have a tension pneumothorax, gather your equipment and staff to immediately insert a 14-16 gauge needle upon opening the chamber door
- Once physician has arrived, bring patient up at a rate of 5 psig or as ordered by the physician
- Following this initial stabilization, make arrangements for appropriate transfer and further management

Reference: Clinical Procedures in Emergency Medicine, 3rd Edition, Ed Roberts & Hedges, W.B. Saunders. Hyperbaric Medicine Practices, 2nd Edition 1995, Eric P. Kindwall, M.D. pp. 291-292

Date: _____

Name:_____

Post Test
Pneumothorax

1. Patients may experience the following symptoms during decompression _____ and _____.

2. During the decompression the pneumothorax expands. (circle) True False

3. A patient suffering a pneumothorax in the Hyperbaric Chamber is not serious. (circle) True False

4. The patient may exhibit signs of cyanosis in the chamber. (circle) True False

5. Patients with any kind of pulmonary lesions on x-ray should have a _____ descent rate.

Emergency Decompression

Introduction: Use Emergency Vent or Exhaust By-Pass only in extreme emergency situations. Rapid loss of chamber pressure may result in barotrauma.

Procedure: **Sechrist -** Turn the Master Valve to the Emergency Vent position and then press the Emergency Vent Button. The chamber will decompress at a rate pf 0.5 psi to 1.0 psi per second.

Sigma 34/Sigma Plus - Turn the system On/Off switch to the off position. Press and hold the Exhaust By-Pass button. The chamber will depressurize in approximately 110 seconds from 30psig to 0psig.

ETC Bara-Med
Place chamber into Manual Mode Press and hold the Exhaust By-Pass (RED) button. The chamber will depressurize in approximately 110 seconds from 30psig to 0psig.

To slow the rate of decompression, the Emergency Vent/Exhaust By-Pass may be pushed intermittently instead of being held down constantly.

Reference: Perry Sigma 34 Manual, pp.30; Perry Sigma Plus Manual, pp. 27
Sechrist Manual 4.9, ETC BARA-Med manual chapter 7 pp 8

Date:_____

Name:_____

Post Test
Emergency Decompression

1. A patient that is suffering from anxiety should be emergency vented out of the chamber. (circle) True False

2. _____to the lungs may occur during emergency ventilation.

3. Patients can be removed from the chamber in 30 seconds or less. (circle) True False

4. The emergency vent button may be depressed _____ to avoid trauma to the lungs.

5. Under what condition would you use the Emergency Vent? _____

Cardiac/Respiratory Arrest

Introduction: Cardiac arrest is a rarity in the chamber since most arrhythmias seem to improve under hyperbaric conditions. It is important to remember that a patient at depth is well oxygenated and will remain so for 5-8 minutes. This allows time for you to call “911” or activate your hospitals “Code Team.”

Procedure: If cardiac arrest occurs in the chamber decompress your patient at a rate of 5 psig (decompression will be between 3-5 minutes) utilizing the emergency button places the patient in danger for a pneumothorax. When chamber door is opened move patient minimum Of 10 feet away from chamber and strip off their clothing prior to defibrillation. *Cold oxygen falls to the floor and dissipates in 30 seconds.*

Equipment: Basic Life Support will be available

References: Hyperbaric Medicine Practices, 2nd Edition 1995, Eric P. Kindwall, M.D. pp. 292-293

Date:_____

Name:_____

Post Test
Cardiac/Respiratory Arrest

1. When the chamber door is opened after an arrest the oxygen will filter throughout the room immediately causing a fire hazard within the room. (circle) True False

2. If it is necessary defibrillate your patient you must move the gurney_____ and remove_____ prior to defibrillation.

3. Cardiac arrest is very common in patients being treated in the Hyperbaric Chamber. (circle) True False

4. If a patient is at 2ATA and you decompress the chamber at a rate of 5.0 psi/min how long will it take the patient to decompress?
   _____

5. The patient's arterial oxygen level is approximately_____ at pressure.

Confinement Anxiety/Claustrophobia

Overview: All patients prior to their first treatment should be assessed for possible confinement anxiety or claustrophobia. To prevent or decrease the effects of confinement anxiety use pre-medication or distraction (TV, movies). Assure the patient that there will be someone present at all times. Reinforce that if the patient wants out of the chamber they will be taken out.

Signs/Symptoms: Clenching of fists, flushed face, profuse diaphoresis, and defensive attitude, urgency to empty bladder, feeling of being smothered or suffocated, sudden complaint of pain or discomfort, complaint of nausea or diarrhea.

Procedure: On your initial assessment if patient states that they suffer from claustrophobia you may want to order an anxiolytic drug. This medication can be given 30 minutes prior to treatment. Some patients may not realize they are claustrophobic until they go into the chamber. Should the patient request to come out of the chamber this must be done immediately. Pre-medication can be ordered prior to their next treatment.

References: Hyperbaric Nursing, Larson-Lohr pp. 137-138, 141-142, Hyperbaric Medicine Practice, Kindwall, pp.54

Date:_____

Name:_____

Post-Test
Confinement Anxiety/Claustrophobia

1. Name three symptoms that your patient may exhibit if they are showing signs of confinement anxiety. _____, _____ and_____.

2. Pre-treatment assessment will help identify patients that may suffer from claustrophobia. (circle) True False

3. _____ may be given prior to the treatment if the patient needs it.

4. If the patient states they want out of the chamber try to keep the patient in so they can complete their treatment. (circle) True False

5. Assure the patient that you are always present in the room should they need anything. (circle) True False

Ear Barotrauma

Overview: Barotrauma to the ear is the most common complication of hyperbaric therapy. It is more difficult to inflate the middle ear because the inner ends of the Eustachian tubes have slit like openings. These openings tend to close tighter if not opened actively by swallowing, yawning or doing the Valsalva maneuver.

Procedure: If the patient experiences mild to moderate pain, stop the pressurization and decrease to the point of no pain. Make sure the patient does not try to clear while the chamber is decompressing. Reinforce equalization techniques and continue to pressurize when patient states they have no more discomfort. If patient experiences severe pain and it is not relieved by stopping the pressurization or decompressing, remove patient from the chamber and notify the Hyperbaric Physician.

Ear Exam: Classification system for the degree of ear squeeze is based on the appearance of the ear drum. It was devised by Wallace Teed, a United States Navy Submarine Medical Officer during World War II.

TEED SCALE
TEED 0 - Symptoms with no physical findings
TEED 1 - Erythema or injection around the handle of the malleus
TEED 2 - Erythema or injection of the entire tympanic membrane
TEED 3 - Hemorrhage into the tympanic membrane appearing as bright red patches
TEED 4 - Deep blue/black appearance of the tympanic membrane due to blood filling the middle ear with the possibility of rupture present.
TEED 5 - Perforated ear drum

References: Eric P. Kindwall, Hyperbaric Medicine Practice, Chapter 4 pp. 51
Larson-Lohr, Norvell, Hyperbaric Nursing, pp. 87,127,140

Date:_____

Name:_____

Post-test
Ear Barotrauma

1. What is the most common complication of Hyperbaric Therapy_____.

2. The TEED Scale was developed to assess patients for potential oxygen seizures.
   (circle) True False

3. Patients should be instructed not to try to equalize during_____.

4. Equalizing techniques include all of the following except: Valsalva, Yawning, Blinking, Swallowing _____.

5. Hemorrage in the tympanic membrane is classified as a TEED 1.
   (circle) True False

Fire Safety/On Site

Overview: The flammability of materials will increase as the partial pressure of oxygen increases to the point where normally non-combustible materials may become flammable or combustible. Materials, generally not considered fuel sources, will burn vigorously in an oxygen-enriched environment (23.5%) such as:

- Human tissue, body hair, oils and fats
- Loose cotton garments
- Oil-based products, facial cream, body oils, hair spray, etc.

Before the patient's treatment, a safety check needs to be completed and documented in the chart. The safety checklist states that the Hyperbaric Technologist or Nurse treating the patient has gone through a checklist of safety procedures.

◊ **FIRE OUTSIDE THE HYPERBARIC UNIT, BUT INSIDE THE BUILDING**

- Follow hospital fire plan

◊ **FIRE IN THE HYPERBARIC UNIT, BUT OUTSIDE THE CHAMBER**

PROCEDURE:

Office Staff or Designee

- Pull fire alarm and call _____ informing them of location of the fire
- Assist in the evacuation of the area per hospital evacuation plan

Nursing Staff

- Evacuate the area per hospital evacuation plan

Director

- Report to the Hyperbaric Unit and stand by to turn off main oxygen as soon as emergency decompression is complete
- After turning off oxygen assist in the evacuation of the Hyperbaric Unit per hospital evacuation plan

Nurse Manager

- Report to the Hyperbaric Unit and prepare to extinguish the fire
- Assist the Hyperbaric Technologist in the emergency decompression of the patient using the emergency vent button (Sechrist) or bypass/exhaust button (Perry)
- Remove patient from the chamber and follow hospital evacuation plan

Hyperbaric Technologist

- Decompress all chambers as quickly and safely as possible using the emergency vent button (Sechrist) or bypass/exhaust button (Perry)
- Notify personnel who is standing by to turn off main oxygen valve
- Remove patients from the chamber and follow hospital evacuation plan

◊ FIRE INSIDE THE HYPERBARIC CHAMBER ON SITE

PROCEDURE:

Office Staff or Designee

- Pull fire alarm and call _____ informing them of location of fire
- Assist in the evacuation of the area

Nursing Staff

- Evacuate the area per hospital evacuation plan

Director

- Report to the Hyperbaric Unit and stand by to turn off main oxygen as soon as emergency decompression is complete
- After turning off the oxygen assist in the evacuation of the Hyperbaric Unit per hospital evacuation plan

Nurse Manager

- Report to the Hyperbaric Unit and place the fire extinguisher next to the chamber on fire
- Assist the Hyperbaric Technologist in the emergency decompression of the patient in the unaffected chambers, emergency vent button (Sechrist) or bypass/exhaust button (Perry)
- Remove patients from the chambers and follow hospital evacuation plan

Hyperbaric Technologist

- Have patient breathe off the air mask and emergency decompress the chamber, emergency vent button (Sechrist) or bypass/exhaust button (Perry)
- Notify personnel standing by to turn off the main oxygen valve
- Prepare to extinguish the fire before removing the patient from the chamber and evacuate the building per hospital evacuation plan

◊ STAFF READINESS FOR FIRE SAFETY MANAGEMENT

PROCEDURE:

All Staff will participate in the hospital's fire drills per the hospital's policy.

1. In order to ensure proper management of the hyperbaric patient's therapy, the hyperbaric unit will be notified in advance of a fire drill.
2. The hyperbaric unit will conduct quarterly department fire drills as part of the Center's safety preparedness.

References: Wilbur T. Workman, Hyperbaric Facility Safety pp. 670-671, Francois Burman, Risk Assessment Guide pp.1.7-1.8
Written documentation from Sechrist and Perry Manufacturer regarding sequence main oxygen cut off valve

Date:_____

Name:_____

Post – Test
Fire Safety/Onsite

1. What percentage is considered an oxygen-enriched environment._____?

2. The flammability of materials decreases as the partial pressure of oxygen increases. (circle) True False

3. List three items that generally are not fuel sources_____,_____ and _____.

4. Normal non-combustible materials may become flammable or combustible when the partial pressure of oxygen increases. (circle) True False

5. 100% cotton is non-flammable in an oxygen-enriched environment. (circle) True False

Subject: Fire Safety/Off Site

Overview: The flammability of materials increases as the partial pressure of oxygen increases to the point where normally non-combustible materials may become flammable or combustible. Materials generally not considered fuel sources will burn vigorously in an oxygen-enriched environment (23.5%) such as:

- Human tissue, body hair, oils and fats
- Loose cotton garments
- Oil-based products, facial cream, body oils, hair spray, etc.

Before the patient's treatment, a safety check needs to be completed and documented in the chart. The safety checklist states that the Hyperbaric Technologist or Nurse treating the patient has gone through a checklist of safety procedures.

◊ **FIRE OUTSIDE THE HYPERBARIC UNIT, BUT INSIDE THE BUILDING**

- Follow hospital fire plan

◊ **FIRE IN THE HYPERBARIC UNIT, BUT OUTSIDE THE CHAMBER**

PROCEDURE:

Office Staff or Designee

- Call "911" informing the emergency operator of the exact location of the fire
- Pull fire alarm
- Assist in the evacuation of the area per hospital evacuation plan

Nursing Staff

- Evacuate the area per hospital evacuation plan

Director

- Report to Hyperbaric Unit and stand by to turn off main oxygen as soon as emergency decompression is complete
- After turning off the oxygen assist in the evacuation of the Hyperbaric Unit per hospital evacuation plan

Nurse Manager

- Report to the Hyperbaric Unit and prepare to extinguish the fire
- Assist the Hyperbaric Technologist in the emergency decompression of the patients, emergency vent button (Sechrist) or bypass/exhaust button (Perry)
- Remove patients from the chamber and follow hospital evacuation plan

Hyperbaric Technologist

- Decompress all chambers as quickly and safely as possible using the emergency vent button (Sechrist) or bypass/exhaust button (Perry)
- Notify personnel standing by to turn off main oxygen valve
- Remove patients from the chamber and follow hospital evacuation plan

◊ **FIRE INSIDE THE HYPERBARIC CHAMBER OFF SITE**

PROCEDURE:

Office Staff or Designee

- Call "911" informing the emergency operator of the exact location of the fire
- Pull fire alarm
- Assist in the evacuation of the area per hospital evacuation plan

Nursing Staff

- Evacuate area per hospital evacuation plan

Director

- Report to the Hyperbaric Unit and stand by to turn off main oxygen as soon as emergency decompression is complete
- After turning off the oxygen assist in the evacuation of the Hyperbaric Unit per hospital evacuation plan

Nurse Manager

- Report to the Hyperbaric Unit place fire extinguisher next to the chamber on fire
- Assist the Hyperbaric Technologist in the emergency decompression of the patients in the unaffected chambers, emergency vent button (Sechrist) or bypass/exhaust button (Perry)
- Remove patients from the chambers and follow hospital evacuation plan

Hyperbaric Technologist

- Have patient breathe off the air mask and emergency decompress the chamber, emergency vent button (Sechrist) or bypass/exhaust button (Perry)
- Notify personnel standing by to turn off the main oxygen valve
- Prepare to extinguish the fire before removing the patient from the chamber and evacuate the building per hospital evacuation plan

◊ **STAFF READINESS FOR FIRE SAFETY MANAGEMENT**

PROCEDURE:

All Staff will participate in the hospital's fire drills per the hospital's policy.

1. In order to ensure proper management of the hyperbaric patient's therapy, the hyperbaric unit will be notified in advance of a fire drill.
2. The hyperbaric unit will conduct quarterly department fire drills as part of the Center's safety preparedness.

References: Wilbur T. Workman, Hyperbaric Facility Safety pp. 670-671, Francois Burman, Risk Assessment Guide pp.1.7-1.8
Written documentation from Sechrist and Perry Manufacturer regarding sequence main oxygen cut off valve.

Date:_____

Name:_____

Post – Test
Fire Safety/Offsite

6. What percentage is considered an oxygen-enriched environment._____?

7. The flammability of materials decreases as the partial pressure of oxygen increases. (circle) True False

8. List three items that generally are not fuel sources_____,_____ and _____.

9. Normal non-combustible materials may become flammable or combustible when the partial pressure of oxygen increases. (circle) True False

10. 100% cotton is non-flammable in an oxygen-enriched environment. (circle) True False

Seizures in the Hyperbaric Chamber

Introduction: Oxygen toxicity occurs in approximately 1.3 times in 10,000 exposures. Pre-treatment assessment is one of the major tools in preventing oxygen toxicity. Air breaks can be used to decrease the potential for oxygen toxicity in patients that are on high doses of steroids, narcotics (narcotics decreases the respiratory drive that can lead to increased oxygen levels) or febrile. The room environment plays a role decreasing the chance of a seizure by eliminating fluorescent lighting in the chamber room.

Signs/Symptoms: Patients may exhibit one or more of the symptoms, however the seizure may happen without warning. Careful monitoring of your patient at all times is essential. Signs of oxygen toxicity begin with: sweating, nausea, vomiting, apprehension, shortness of breath, tunnel vision, tinnitus and muscle twitching.

Other Considerations: Seizures may also be caused by hypoglycemia, high doses of steroids, hyperthermia, and chemical/alcohol abuse.

Procedure: If patient is observed or complains of any of the above symptoms have the patient breathe off their air break system, this will lower their oxygen level. Notify the Hyperbaric Physician supervising the treatment. Continue air breathing for 5-10 minutes until patient states they feel better. Discontinue patient's treatment and decompress the patient at a normal rate. ***If patient is a Diabetic immediately check blood sugar, episode could be hypoglycemia.*** Prior to the next treatment incorporate an air break in the patient's treatment protocol. If patient has a seizure it will consist of a tonic phase where the patient may hold their breath. ***Never decompress at this phase.*** When the patient begins a jerking motion this is the clonic phase. Patient should be observed for breathing, chamber can be decompressed at a rate tolerated by patient. Patient should have a complete assessment done post treatment. The Hyperbaric Physician will determine the course of action for the patient.

References: Hyperbaric Nursing. 2002, Larson-Lohr., Norvell, pp. 143-144 pp. 250-251; Hyperbaric Medicine Practices, 2nd Edition 1995, Eric P. Kindwall, M.D. pp. 80, pp. 290-291

Date:_____

Name:_____

Post Test
Seizures in the Hyperbaric Chamber

1. Patients will always exhibit one or more signs/symptoms prior to having a seizure in the chamber. (circle) True False

2. The seizure will consist of two phases:_____ and _____ .

3. You can only decompress the patient during the clonic phase. (circle) True False

4. _____is the major tool used to help you prevent oxygen toxicity.

5. During your pre-treatment assessment what at some of the factors that would determine if the patient should get an air break incorporated in the their treatment protocol. _____, _____, _____.

Insert your chambers yearly Service / Maintenance Report(s) Here

(See attached sample)

QUARTERLY QUALITY ASSURANCE OF EMERGENCY PROCEDURES

REQUIREMENTS: One Fire Safety Drill each quarter. Choose one of the other three topics each quarter.

TOPICS	DATE	MET	NOT MET	COMMENTS
Fire Safety				
Cardiac/Respiratory Arrest				
Pneumothorax Under Pressure				
Seizures in the Hyperbaric Chamber				

SAFETY DIRECTOR_____MEDICAL DIRECTOR_____

DEPARTMENT OF HYPERBARIC MEDICINE

II. HYPERBARIC ADVERSE EVENTS

ADVERSE EVENTS

1. Ear Squeeze
2. Sinus Squeeze
3. Oxygen Toxicity – *CNS & Pulmonary*
4. Nausea / Vomiting
5. Pneumothorax

ADVERSE EVENTS

6. Air Embolism
7. Seizure – *Oxygen Related, Diabetic Related , Other*
8. Confinement Anxiety
9. Diabetic Reaction
10. Other – *Please Specify*

MONTH: _____

Medical Record #	Adverse Events	Intervention	Comments

SAFETY DIRECTOR_____**MEDICAL DIRECTOR**_____

Notes: