

Hyperbaric Chamber Emergency Procedures

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HBO CHAMBER EMERGENCY PROCEDURES

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NO DISCLOSURES

- **EMERGENCY DECOMPRESSION PROCEDURE**
 - Rapid Controlled Ascent or “3 & 3”
 - Emergency Manual Ascent
 - Emergency Automatic Ascent
- **FIRE RESPONSE**
 - In the building
 - In the HBO room
 - In the HBO chamber
- **MECHANICAL FAILURES**
 - Oxygen supply failure
 - Chamber door pin jam
 - Communication failure
- **MEDICAL EMERGENCIES**
 - Oxygen toxicity
 - Pneumothorax
 - Cardiac arrest

EMERGENCY DECOMPRESSION Procedure Rapid Controlled Ascent or “3 & 3”

When Rapid Patient Access is Crucial
but there is a Medical Need to take it Slower

Examples to Consider:

1. Cardiac Arrest
2. Pneumothorax
3. Fire in HBO room & Patient has history of pneumothorax

EMERGENCY DECOMPRESSION Procedure Rapid Controlled Ascent or “3 & 3”

Set the chamber pressure to zero

Inform patient: DO NOT hold breath

Turn master valve to EMERGENCY VENT

Press EMERGENCY VENT, hold **3 seconds ON**
3 seconds OFF

Repeat until the chamber reaches 1ATA

Open chamber door & remove patient

Consider STAT chest X-ray if pulmonary barotrauma is suspected

EMERGENCY DECOMPRESSION PROCEDURE

- ▶ **Emergency Manual Ascent**
 - Same as *Rapid Ascent Procedure* except you **Press and Hold Down** the **RED** Emergency Vent button until the chamber returns to surface. Rate will be approximately 1psi/second.
- ▶ **Emergency Automatic Ascent – (e.g. Fire in Chamber)**
 - Lift the **Red** emergency shut down cover. Move toggle switch up. Chamber automatically decompresses approximately 1psi/second.
 - This hands-free function allows staff to proceed with other RACE actions.
 - ✓ pull fire alarm
 - ✓ don smoke hood
 - ✓ use fire extinguisher

FIRE RESPONSE

Actions are determined by:

The patient census and acuity

The size and proximity of the fire

The current staff capability

FIRE RESPONSE

RACE

Rescue * Alarm * Confine * Extinguish/Evacuate

PASS

- ❖ Pull pin in the handle
- ❖ Aim the nozzle at the base of fire
- ❖ Squeeze the lever slowly
- ❖ Sweep from side to side

Know your "ABC's" How familiar are you?
What is your extinguisher's discharge time?



ABC Amerex B441
10 lbs
15-21 ft range
195 psig

FIRE RESPONSE

1. Fire in the Adjacent Area

1. Ensure doors to HBO unit are closed
2. Determine proximity or degree of danger

If imminent, proceed as follows:

3. Inform patient; "I'm taking you out, breathe normally. I will not leave you."
4. Decompress at 5psi/min, or as ordered
5. Activate fire alarm/signaling device, if not already in progress



FIRE RESPONSE

Fire in the Adjacent Area continued

6. Don the smoke hood, if warranted
7. Turn off the chamber oxygen and evacuate, if warranted
8. Close the oxygen zone valve upon exit.




FIRE RESPONSE

2. Fire in the HBO Facility

1. **Rescue** those in immediate danger. Alert patient in chamber of plan to abort treatment; "I'm bringing you out, breathe normally, I will not leave you"

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2. Assess degree of danger. Don smoke hood, if needed. Decompress at 5psi/min or initiate emergency decompression procedure, if indicated



FIRE RESPONSE

2. In the HBO Facility continued

3. At 1ATA, turn off chamber, remove patient. Close O2 valve at chambers, unplug electrical cords in vicinity
4. **Activate** fire alarm, if not already done
5. **Contain** fire by extinguisher or by closing the door and evacuating the unit
6. Close oxygen zone valve upon **exit**





FIRE RESPONSE

3. Fire in the Chamber (Extreme Danger)

1. Immediately activate Emergency Automatic Ascent procedure to rescue patient.
2. Activate fire alarm. Avoid standing at ends of chamber and keep clear of the door seal.
3. Decompress other occupied chambers and evacuate all patients in the facility
4. Don smoke hood & safety gloves prior to opening chamber door. Have fire extinguisher ready.



FIRE RESPONSE

3. Fire in the Chamber (Extreme Danger)

➔ Extinguish fire, remove patient, assess ABC's, proceed per provider's order.

⊘ Upon exiting, close the dept doors and turn off the oxygen zone valve

+ Seek medical care for patient(s)




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MECHANICAL FAILURES



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Scenario #1

- ▶ You are treating a patient at 2ATA (14.7psig).
- ▶ During a wellness check you notice the SET PRESSURE gauge is reading 8 psig & the CHAMBER PRESSURE gauge is reading 11 psig and each are steadily dropping. An audible alarm begins ringing.
- ▶ *What is happening and explain how you would respond?*



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OXYGEN SUPPLY FAILURE

Hospital gas sensors detect loss of oxygen pressure. HBO facility gas alarm is activated




Normal chamber oxygen pressure is 50-70psi

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OXYGEN SUPPLY FAILURE (continued)

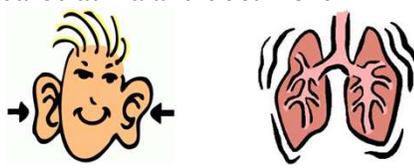
1. Without causing undue concern, inform patient that the chamber is decompressing.
2. Caution patient: "DO NOT hold your breath"
3. Depending on location of leak, chamber will decompress 3-5psi/min (the closer the leak is to the chamber, the faster the rate)
4. Turn SET PRESSURE gauge to zero
5. At 1ATA, turn off MASTER VALVE, remove patient from chamber



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OXYGEN SUPPLY FAILURE (continued)

6. Inform provider. Assess patient for barotrauma and document
7. Report failure to HBO Safety Coordinator and engineering. Document in unit log



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CHAMBER DOOR SAFETY PIN JAM

At the end of the treatment with patient inside chamber

The chamber door will not open & the chamber pressure gauge reads 0 psig

The chamber door safety pin may be jammed in the extended position.

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RELEASE SAFETY LOCK PIN

1. Insert a blunt instrument into the hole; e.g. eraser head of a pencil. Not your finger.
2. Push the pin back into the retracted position.
3. Note incident in the chamber log and inform HBO Safety Coordinator.

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Safety Pin Engaged

Pressurized for treatment or
Jammed after treatment



Safety Pin Retracted

After treatment. Able to open
the chamber door



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Blunt Instrument Entry



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COMMUNICATION FAILURE

1. The chamber phone is not working
2. Communication failure occurs from a dead battery, power outage, damaged or disconnected power adaptor, phone or power cord unplugged.
3. Make rectifications, if able.
4. Or use Cue-Cards to advise patient of communication failure.



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COMMUNICATION FAILURE

- Assess patient's level of comfort
- Notify provider, determine if continuing treatment
- If treatment aborted, start normal decompression rate while communicating with the patient using cue cards.
- Note incident in chamber log and inform Safety Coordinator

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Cue Cards (English and Spanish, Large Font)



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MEDICAL EMERGENCIES



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SCENARIO #2

80yo male with a history of diabetes & acute necrotizing fasciitis. Pretreatment blood glucose 135. Temperature 101.3 °F. This is his first treatment: 2.5 ATA for 90 mins with two 10 min airbreaks.

After 25 minutes at pressure, EKG monitor alarms; pulse is 130bpm. He's anxious and complains of seeing flies inside the chamber with him.

What is happening?
What is your first action?



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OXYGEN TOXICITY

Signs and Symptoms

1. Visual Hallucinations
2. Auditory Hallucinations
3. Irritability
4. Nausea/Vomiting
5. Tachycardia/Bradycardia
6. Twitching
7. Tinnitus
8. Dizziness/Disoriented
9. Anxiety
10. Diaphoresis
11. Convulsions



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OXYGEN TOXICITY (response)



Immediately convert patient to an airbreak; note time. Notify provider. Offer reassurance.

Within two minutes, ask patient if symptoms have resolved, improved, remained the same or worsened?

If S/S **Resolved**, patient to complete 10-minute airbreak. Provider modifies or aborts treatment due to premonitory s/s Oxygen Toxicity

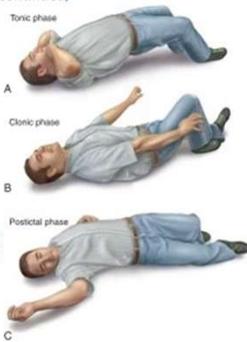
If complaint of anxiety remains **Unresolved** and patient requests to come out. We must honor his request. Continue airbreak while notifying provider of patient's wishes. Proceed as ordered.

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OXYGEN TOXICITY (continued)

If decompression is planned, maintain patient on airbreak during ascent. **Staff must stay at control panel and maintain direct visual observation of patient throughout ascent.**

If patient Seizes: STOP!
DO NOT alter chamber pressure!



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Never use the RED emergency vent!

SCENARIO #3

47yo male with a failed skin graft on his hand from a car engine fire. He is otherwise healthy. It is the end of his 4th treatment & has tolerated prior treatments without complications.

You inform him that the treatment is over and you are beginning to decompress the chamber from 2 ATA. He gives you a thumbs up!

At 10psi he yells out in sudden distress while holding his chest with one arm. He complains of sudden sharp stabbing pain. You observe shortness of breath. His pulse spiked to 120bpm

1. What has happened?
2. How do you help your patient?

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PNEUMOTHORAX

Signs and Symptoms



- Sudden, stabbing chest pain
- Uneven chest excursion during respiration
- Deviated trachea (tension)
- Acute ECG changes
- Increasing respiratory distress, SOB
- Distended neck veins (tension)

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PNEUMOTHORAX (continued)

-  Immediately halt further decompression; note time of complaint
-  Notify hyperbaric provider
-  Increase chamber pressure slightly to help alleviate symptoms
-  Inform patient of suspected pneumothorax and its required management



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PNEUMOTHORAX (continued)

- Prepare chest tube tray (possible needle aspiration)
- Begin controlled decompression of patient as ordered by provider
- At 1 ATA, turn off master valve, remove patient from chamber
- Have supplemental oxygen with mask available
- Assist provider manage the patient's pneumothorax
- Order STAT chest x-ray/arrange for transport if needed



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SCENARIO #4

A 78yo, alert and oriented, female arrives for her 6th HBO treatment for osteoradionecrosis of the mandible.

After 30 minutes into her treatment, you approach the control panel phone to instruct her to start her air break, but instead you observe her drooling and unresponsive to your verbal commands.

The EKG monitor alarms and displays a heart rate of 39bpm and is steadily declining. There are no visible signs of respirations.

- What do you suspect is happening?
- How do you respond?



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CARDIAC ARREST (continued)

-  Notify provider & activate code blue system; note time of occurrence
-  Turn set pressure to zero psi, begin controlled decompression at 5psi, or as ordered
-  Consider emergency decompression procedure if patient stops breathing, observe patient continually
-  Once at zero psi, turn off master valve, remove patient.

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CARDIAC ARREST (continued)

- Apply mask oxygen, check ABC's, start BLS
-  Prior to defibrillation, move patient away from chamber
-  Remove material saturated with 100% oxygen; pillow, mattress, linen, gown from patient (if possible, move patient to another stretcher with back board)
-  Assist code team as required and prepare to transport to ER
-  Complete documentation as time permits

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CARDIAC ARREST (continued)



NOTE:
Consider chest tube set up and
STAT chest x-ray

NOTE: Defibrillation/Cardioversion should be held until the patient is moved away from the chamber entrance and all oxygen saturated linens and mattress are removed.



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Emergency Procedure Cards Posted at Chamber



NFPA 99: All Emergency Procedures must be drilled annually. Must be "Hands-On," include the entire HBO team and documented. This includes quarterly HBO fire drills.

-NBS recommends performing one emergency procedure drill every month.-

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Annual Safety Drill Agenda (Suggested Example)

- ▶ January: **Fire in the Chamber**
- ▶ February: **Loss of Oxygen to the Chamber**
- ▶ March: **Pneumothorax in the Chamber**
- ▶ April: **Fire in the HBO Room**
- ▶ May: **Communication Failure**
- ▶ June: **CNS Oxygen Toxicity/Seizure**
- ▶ July: **Fire in Adjacent Area of Building**
- ▶ August: **Safety Pin Jam**
- ▶ September: **Cardiac Arrest in the Chamber**
- ▶ October: **Fire in HBO-Timed Egress with Worst Case Scenario***
- ▶ November: **Active Shooter approaching HBO Room**
- ▶ December: **Practice donning smoke hood or using fire extinguisher (PASS) or "3 & 3" rapid controlled ascent**

*Timed egress required once a year

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HBO CHAMBER EMERGENCY PROCEDURES

QUESTIONS?



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