



EVACUATION AND HYPERBARIC MEDICINE

by *Kenneth Capek RRT, CHT, MPA*

What if a fire started in close proximity to your hyperbaric chamber area and you could even smell the smoke? Would you know how to react and evacuate the patient? How long would it take to get the patient out of the chamber and away from danger?

The National Fire Protection Association (NFPA 99) standards states that a monoplace chamber must have the ability to decompress from 3 ATA to 0 ATA within two minutes. Does yours?

Let's complicate the situation. The patient is barely ambulatory due to a partial foot amputation, and now smoke is filling the upper half of the chamber room. Okay, I won't be too hard on you. The patient is breathing without mechanical assistance, but he does have an IV running. Did I mention the patient already came in with an elevated anxiety level, and that you're alone in the hyperbaric area at this point?

I'll bet it's hard to keep someone calm when you, yourself, are terrified and it's written all over your face

I think you see where we are headed. I recommend practicing an evacuation scenario in your department as soon as you can. Find out how long it would take to get the patient to safety and consider how to handle all the possible barriers or unexpected

problems that might arise.

What follows is an examination of some considerations and possible actions meant to generate thought and discussion.

If a patient is unable to ambulate quickly, he will need your assistance. One option is to move the patient to the wheelchair or stretcher they have come in with. A quicker method may be to use the monoplace chamber stretcher that the patient is already on.

Then again, if flames are nearby we must decide whether we want to use the chamber stretcher and cushion, which is saturated with oxygen. It can take about 20 minutes for oxygen to fully dissipate from a saturated mattress. In this case, lowering the patient to a blanket on the floor so that she can be pulled out might work best.

Other things to consider:

- Do you know how to safely lower a patient from a stretcher to the floor without throwing your own back out?
- Do you have any idea what you would say to the patient as you rapidly start to decompress them?

I think it would be very hard to keep someone calm when terror might be written all over your face. Then again, if the patient sees smoke, panic may be unavoidable. Breathe slowly and speak in a calm reassuring voice; "We must leave this area, but I will stay with you, and we will both be okay."

If the smoke became terribly bad in the chamber area, do you think you could last long enough to get the patient out of the chamber before you succumb and lose consciousness? In this scenario a smoke evacuation hood is vital. Do you have one in the hyperbaric area and, if so, have you ever practiced with it?

The current 2005 edition of NFPA 99 specifically addresses this issue. It states, "A source of breathable gas allowing unrestricted mobility shall be available outside a Class A (multiplace) or B (monoplace) chamber for use by personnel in the event that the air in the vicinity of the chamber is fouled by smoke or other combustion products of fire."

This standard can be met by having a self-contained breathing apparatus (SCBA) or "smoke hood" with filtration system. The specific type of hood you purchase should be based on the time it takes to actually evacuate a patient. The evacuation duration time can only be known by performing an evacuation drill in your facility. Practice using the hood, but do not remove the airtight filter plugs for the drill or they will need to be replaced.

If more than one health care provider works in the hyperbaric area, an additional hood may be required. Most importantly, the mask must be used properly to be effective, may only be used once, and doesn't protect against the lack of oxygen in the room. Instructions state to breathe calmly when using.

How about that IV? Maybe it can just be removed. Or maybe you can place the plastic IV bag under the patient to keep some pressure on it during the evacuation period. Of course, in a monoplace chamber, the tubing passes through the door, so it needs to be replaced. That can use up valuable time. A mechanically ventilated patient would simply need to be "bagged" and would probably not need an "E" cylinder of oxygen because his PO₂ level may already be over 1,000. Of course the bag would then be drawing in room air, which might be smoke filled.

In terms of other equipment, a fire extinguisher is mandatory in the area, and it should have a check date that hasn't expired. Have you ever used one? Wouldn't it be good practice

sion device. Upon harvesting the organ, donor blood is circulated through the heart-lung pump to the warm, living organ. The donor blood is heated and oxygenated, and the organ is transplanted in a pre-oxygenated state. This warm organ perfusion device will greatly expand the currently limited transplant window. This breakthrough innovation will have a significant impact on all organ transplants.

1: Use of Circulating Tumor Cell Technology

A new technology will enable oncologists to measure circulating tumor cells (CTCs) in a sample of blood. CTCs are cancer cells that have broken away from an existing tumor cell and are found in circulating blood samples. The detection of CTCs is a significant finding and may help predict a patient's prognosis.

This technological advance will facilitate the early detection of rogue cancer cells in patients who have experienced recurrent cancer. This will give patients the ability to assess their progress with treatment and focus the patient-physician team on future therapeutic options. This breakout technology will have critically important reproductions in the lives of many cancer patients' worldwide and will help in guiding future therapeutics.

The informed clinician will, of course, understand that this has been but a perfunctory review of these exciting technologies. I think it is an essential component of compassionate, evidence-based care that clinicians maintain a contemporary knowledge of evolutionary therapeutic options. To that end, I would encourage further investigation of these innovations.

David Wheeler, RRT-NPS is the Educational Coordinator for the Cardio-Thoracic Anesthesia and Respiratory Therapy Departments at the Cleveland Clinic. He can be reached at wheeled@ccf.org.

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to take one outside in nice weather and do a PASS (Pull, Aim, Squeeze, Sweep)? Some may only last for 10 seconds of use and can get very cold to the touch when handling.

More things to consider:

- At what point would you close the main oxygen shut-off valve for the hyperbaric area – as you run past it?
- If a horizontal evacuation can no longer be used, where are the stairwells located?
- If the fire has blocked your exit, is there a second exit door? If both were blocked would you seal the doors with wet blankets while notifying security of your trapped situation?
- Sometimes windows can be used for escape but this decision is made only after better options are eliminated.

In discussing these scenarios with staff, we found ourselves unsure of some of the answers, which raised our anxiety levels. Not knowing the answers ahead of time can lead to wasted time and panic - a deadly mix. If practice in a controlled situation can raise tension, imagine the anxiety and staff performance in the real situation.

Knowing the answers and practicing the procedures is the only way to give your patient and yourself the best chance of getting it all right when your survival depends on it. Why not practice a fire evacuation in the hyperbaric department as part of the hospital-wide fire drill program for 2009?

Ken Capek, RRT, CHT, MPA is Director of Respiratory Care and Hyperbaric Oxygen Therapy at Englewood Medical Center in Englewood, NJ. He can be reached at Ken.Capek@ehmc.com

rescue long-acting bronchodilator that relaxes the muscles in the airways to improve breathing. Budesonide is a steroid that reduces inflammation in the airways. Symbicort is also used to treat bronchospasm in people with COPD, chronic bronchitis and asthma ("Drugs, 2008"). The difference between these two drugs is that formoterol has an onset of 15 minutes and a peak time of 30-60 minutes when compared to Salmeterol's onset of 20 minutes and peak time of 3-5 hours (Gardenhire, 2008).

Advair's dosing should be administered orally inhaled only and given twice daily. If this drug is to be given in a sequence, Advair is to be given last. First, the fast acting rescue bronchodilator is given (SABD), along with mucomyst if needed. The very last drug given would be Advair, making sure the patient rinses and spits afterwards. Advair Diskus is a powder form of fluticasone and salmeterol that comes in a special inhaler device preloaded with blister packs that contain measured doses of medicine. Advair also comes in an HFA inhaler; this is considered the more "green" approach, and is better for the environment when compared to a metered dose inhaler. After the drug is inhaled, rinsing the mouth without swallowing is ideal to prevent the growth of yeast in the mouth. There are three combinations of dosages available, the smallest dosage is 100mcg/50mcg, the intermediate dosage is 250 mcg/50mcg, and the highest dosage is 500mcg/50mcg. Another important factor to consider when taking a dry powder inhaler is that the patient must be able to generate air flow at least 60 liters per minute to adequately take the medication (Gardenhire, 2008).

Many concerns have been raised that salmeterol may increase the risk of an asthma-related death. Research has shown that the African-American ethnicity has a higher risk than Caucasian ("PDR", 2007).

In conclusion, I researched in the Asthma and COPD guidelines in Appendix D and found that Advair is to be given at step 2, mild persistent asthma the preferred treatment is a low-dose inhaled corticosteroid. From all of this research and case studies, I found that Advair is safe for use, even though there were deaths related to the use of this drug. It's too bad that this drug was not available 15 years ago, when my younger sisters suffered from asthma. I feel they could've benefited from it to increase their quality of life.



"Sorry the product didn't work. We'll send you another one that doesn't work."