

Dr. Chris Carr's Critical Care Notes
Vanderbilt Regional Burn Center

Hey gang,

I did Talc Pleurodesis on John Doe today. This of course is a form of Chemical Pleurodesis as compared to Mechanical Pleurodesis which we do in the Operating Room.

Mechanical Pleurodesis is a rather barbaric procedure whereby you perform abrasion (you can literally use a bovey pad to do this) to the parietal pleura with the goal of creating adhesions between the parietal pleura and the visceral pleura upon healing of the abrasions. The patient experiences lots of pain after Mechanical Pleurodesis.

Pleurectomy of the Parietal Pleura can also be performed to obtain the same result. The goal of Pleurodesis is to eliminate the potential space between the visceral and parietal pleura which eliminates the ability for fluid or air to collect. The usual indications are malignant pleural effusions and persistent non-malignant effusions (less common) and sometimes for pneumothorax.

Mr. Doe essentially has a Pleurocutaneous Fistula because he has no subcutaneous tissue to seal the chest tube tract after it is pulled. This is why he reaccumulated a pneumothorax after pulling his chest tube initially. He 'sucked' the air through his chest wall during spontaneous breathing which generated the negative pressure to create the pressure gradient with respect to atmospheric pressure for air to flow through his chest tube hole into his chest. (The lung was not leaking air; we know this because he didn't have any airleaks in the Pleurovac and his lung compliance has actually been okay permitting him to heal the initial injury during line insertion.) This is a difficult problem and is why we are trying Chemical Pleurodesis before pulling the chest tube again. We are attempting to obliterate the pleural space to prevent the same problem again. If it fails then he may need a tissue transfer operation to cover the holes in his chest.

Many agents have been used to accomplish Chemical Pleurodesis. Talc is the most historic and it turns out that 'the data' probably supports its continued use. Other agents that have been used include tetracycline, doxycycline, minocycline, bleomycin, silver nitrate, iodopovidone, etc. If you want, check out the review of Chemical Pleurodesis on Up-To-Date.

The dose of Talc for pleurodesis is 5 grams. The powder is formed into a Talc Slurry by injecting 50cc of NS into the bottle after which the bottle is shaken to disperse the talc.

The pharmacy may send the talc already in slurry form. The 50 cc content is then divided into two 25 cc aliquots in 60 cc syringes. Aspirate another 25 cc of NS into each syringe. Each syringe should now have a 50 cc solution containing 2.5 g of talc.

Aspirate 10cc of air into each syringe so that you can continue shaking or swirling the talc solution.

Before delivering the talc solution into the chest tube, administer some analgesic and maybe even an anxiolytic for mild sedation since the chemical pleurodesis may be painful and anxiety-provoking.

Before delivery of the talc solution, remove the chest tube from suction. Find an area on the rubber tubing from the pleurovac that attaches to the chest tube. Choose an area close to the chest tube. Sterilize the area with alcohol, betadine, or hibiclens and then use a 20 gauge needle attached to the 60 cc syringe to deliver the Talc solution through

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the rubber tubing into the chest tube. Insert the needle at a low angle so you 'skive' your way into the lumen of the tubing; this prevents any leaks from the tubing itself after you are done with the procedure. Repeat with the second 50 cc of talc solution in the other syringe; be sure to eliminate the air in each syringe before delivery of the talc. This is how I was taught during residency on the thoracic service and is exactly what I did today. You will find the procedure is similar to the method in the Up-To-Date review although it is not exactly clear in the review how the solution is delivered. Another option is to disconnect the chest tube completely and then deliver the solution directly through the end of the chest tube, but I wouldn't favor doing this because I think there is more risk for contamination and because it would be hard to control air being introduced into the space you are trying to eliminate.

After the Talc is instilled through the chest tube, clamp the pleurovac tubing as close to the chest tube as possible. If you have a big clamp, the chest tube can be clamped directly near the skin.

After delivering the Talc solution into the thoracic cavity, ask the nursing staff to reposition the patient every 15 minutes for at least 1 hour to facilitate distribution of the Talc solution in the thoracic cavity. Ideally the position changes would be at least 180 degrees but this may need to be modified in critically ill patients. The Up-To-Date review reports no evidence to support this maneuver but it seems reasonable if possible.

Also, hang the Pleurovac from an IV pole thereby using gravity to facilitate delivery of the talc into the thoracic cavity.

The procedure may be repeated in 48-72 hours if CT drainage is > 150cc per 24 hours.

Regarding the Re-Insertion of Chest Tubes into the thoracic cavity after they are pulled (i.e. recurrent Pneumothorax or Effusion), the traditional teaching is to create a new hole. This makes sense because a new thoracostomy hole will be cleaner than an old hole and may help prevent a complication like Empyema. In situations like Mr. Doe's however, I would advocate using the same hole after a good prep even though it would be a controversial technique. He underwent fascial excisions of his burns and has no subcutaneous tissue so there is no tissue to seal the tract upon removal of the chest tube and intercostal muscle does not hold stitches very well when trying to suture the hole closed. Creating more holes potentially creates more Pleurocutaneous (actually a misnomer!) fistulas that need to be treated. I would like to see what Dr. Fogerty and Dr. Guy think about this.

Anyway, I wanted to review the technique of Chemical Pleurodesis that I performed today. Understand that the indication in him is unusual, but then again this isn't an unusual situation with severely burned patients!!

Also, Dr. Fogerty placed some U-stitches around the two thoracostomy holes in his right chest. Tie these on removal of the chest tube to assist closure.

As for removal of the chest tube, it can be done as soon as 24 hours after pleurodesis. I might wait a bit longer in Mr. Doe since I think he might be immunologically compromised from his big burn, sepsis, etc and might need more time for pleurodesis to take effect. The other option is backing out the CT like a fistula tube; Dr. Guy mentioned

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this to me and may talk about this being an option on rounds. I would also question if a period of positive pressure ventilation would be indicated during/after chest tube removal to fully expand the lungs.

FYI, the thoracic service has an order set for Chemical Pleurodesis on Wiz.

Finally, this case magnifies the importance of complications with regard to central line insertion. The original pneumothorax was associated with a line placed less than one day before. There will always be some incidence of line-associated pneumothoraces. Unfortunately, the original complication may lead to further complications in critically ill patients like those on the Burn Unit.

Have a good evening,

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