Dry Suction Chest Drainage System - Care and Maintenance

Female1: So the first thing we want to note about this system is that this is a dry suction unit. And there are three chambers within in. So the first one here is on the right-hand side, this is our collection chamber. So this is where all the fluid that we're draining out of our chest tube is going to collect. So as a nurse it would be our responsibility to at least at the end of every shift note where exactly the fluid is sitting. And talk a little bit about what we're observing in that fluid itself.

Female2: So we do just dry a line here and-- date and time?

F1: Date and time, yes. The next area that we want to look at is our water seal chamber. So this is our water seal chamber over here. And you note that the water is filled to two centimetres. The water seal chamber is what allows air to exit that pleural space and not have atmospheric air sucked back into the pleural space. So that's why we use this here.

F2: So if there was air escaping, I would see bubbles in here?

F1: You would see bubbles in there. And one of the really common questions that students have is around what are normal and abnormal findings [when] looking at a chest drainage system. And so when we're talking about bubbling, you'll see bubbling down here in this chamber. And you see it's ranked sort of one to five. So one would be a little bit of bubbles, five would be a lot of bubbles. So this can be a normal finding. Having bubbles in the water seal chamber can be a normal finding if a client is exhaling, if a client is coughing, if a client is sneezing or if, in fact, a client is resolving a pneumothorax that they have. So air is escaping from the pleural space which is what we want to happen. When you would think the

bubbling is perhaps abnormal is if it were more continuous, happening all the time, not changing with inhalation and exhalation. And in that case we would suspect that perhaps there is a leak somewhere in the chest tube system that we're going to need to investigate further.

F2: Yes, so it's a continuous supply of air.

F1: Absolutely. The other thing you might notice in here is this little tiny white ball. And this ball moving up and down is what we refer to as tidaling. So typically when clients breathe in on inspiration the ball will go up. On expiration the ball will go down. This is another example of where tidaling can be a normal or an abnormal finding depending on what's going on with your client. So, for instance, if we have suction onto the system you will almost never see tidaling of the ball. So that's something to bear in mind. This could be a normal finding, potentially, if the reason for the chest tube, your pneumothorax, your hemothorax, your chylothorax has actually resolved. It may be a normal finding that there's no tidaling happening. Potentially, the failure of the ball to move up and down, the failure to have tidaling, can be an abnormal finding that indicates that perhaps there's a kink or occlusion somewhere in the tubing. So again, when we're looking at the chest tube drainage system and assessing it it's always in relation to the patient. So look at the patient first, and then start troubleshooting what may or may not be going on with the system.

F2: So if they were not on suction, I would be expecting to see some tidaling.

F1: Yes.

F2: And if I didn't, that would be a clue to me to check out, see what's going on here.

F1: Yes. Either that lung has fully reexpanded or there's a kink or occlusion somewhere along the line..

F2: Would the patient be feeling anything?

F1: Chances are they would. It might be harder to breathe. You may notice alterations to respiratory rate, respiratory effort, pressure that they describe in the chest. So always start with your patient. The last chamber to look at here is the suction control chamber up here. So you'll notice that on a dry suction unit we have the ability to set the suction based on centimetres of water. So typically chest drainage systems will be ordered either to gravity in which case there'll be nothing attached to the port up here. Or they will be ordered to around minus 20 centimetres water of suction. So there's a dial on the side that allows you to adjust it anywhere from minus 10 centimetres water up to minus 40 centimetres of water. And we would plug that in right up top here. What's really important to note is that regardless of how high you have the suction cranked on the wall, this regulator here is what's going to determine the actual amount of suction being applied to the system. So it's determined by the regulator that's built into the chest drainage system.

F2: So how will I know that it's on at the right amount?

F1: So you're going to always check your orders, your practitioner orders, regarding what the level should be set at. Then when you're visually looking at the chest drainage system itself, if you look in here, this is referred to as the suction bellows. The suction bellows has a bright orange balloon in it that--

F2: Oh, I can see it right here.

F1: --when suction is actually applied that bellow should come out past the level of this arrow here.

F2: Oh, right where that arrow--

F1: Absolutely. So just a quick visual inspection at the bedside: If you see the bellows in this visual window you know that suction is being applied to the system.

F2: And so if it's not there?

F1: Then it's either to gravity, so again you have to know your order, or something has not been hooked up properly to suction.

F2: What else can go wrong -- what if this accidentally gets kicked over?

F1: If it accidentally gets kicked over? So most of these drainage units, again, you have to refer to manufacturer's instructions. But have mechanisms built in that if they're knocked over you can set them upright and they should be okay. But again, you have to be familiar with the products that you're using.

F2: Okay, so this is happened to me in the past is that I accidentally got it-- it was kicked over, and I had lots of drainage and I ended up with drainage in all three [compartments]. And so what we did is just line them so that you know that this was from that shift. And then we carried on with--

F1: Absolutely. The other thing we should talk about is clamping of the tubes and rules around that. So if you notice there is a clamp that will be on every single chest tube drainage system. And there are very specific reasons that we clamp and very specific reasons only. So the first instance in which we might choose to clamp the system for only moments at a time is if we're actually changing out this

chest tube drainage system. So this is completely full. We've gone to 2100 cc's of fluid and we need a new system. In that case we would clamp for just a couple of seconds close to the site here. Quickly clamp and then we would disconnect this unit here. We would already have a new chest drainage system ready and waiting to go so that it wasn't clamped for more than a couple of seconds. So the danger, of course, with clamping is that we can actually create a tension pneumothorax in our client and now we have a whole other emergency that we'll be dealing with.

F2: That means that there's no way for the air to go out so it just keeps building up in the chest and then will compress the lungs [and other things].

F1: Absolutely. The other time we may clamp is if we notice continuous bubbling in our water seal chamber and we suspect a leak. So we would start at the site closest to the client. We would clamp for a second or two, notice when the bubbling stops. If not, go down again a couple inches, clamp. So we're looking to find out where we think that leak may be.

F2: Because there could be something in the tubing, right.

F1: Absolutely, there could be a hole in the tubing. The only other time that we ever clamp chest tubes is when chest tube is ready to [be] take[n] out. So-- and this will be a practitioner order that says, you know, we're preparing to take out the chest tube in four to six hours, clamp it, and let's see how the client tolerates it before we take it out. Other things to know in terms of care [is] that it's really important that we never milk or strip the tubing.

F2: What does that mean?

F1: That means purposely moving the fluid in the tubing or purposely squeezing it.

We used to do this because we thought it helped with preventing clots in the line. It's not a routine practice, and the danger is that you actually increase intrathoracic pressure in ways that can damage pleural tissue. No milking, no stripping of the line. Keep dependent loops out and just allow this to function as it's meant to set at the level of suction its set.