Electrosurgery & The Bovie

(0:01 - 0:28)

What's up everybody and welcome back to another Surgical Tech Tips. Today's video we are going to be going over probably one of the, well one of the most important machines in the OR that we utilise in the surgical room and that is the ESU or the electro-surgical unit, also known as the BOVI. It's basically the machine that utilises monopolar and bipolar cauterisation during surgery.

(0:29 - 0:44)

This is going to be good. Now to start this off I wanted to just do a little brief little snippet into the history of the BOVI machine. It started back in the 1920s.

(0:44 - 1:21)

There was a physicist by the name of W.T. BOVI that invented the spark gap generator which quickly evolved into the electro-surgical generator and over many different iterations and upgrades it's now what we use today, the electro-surgical unit or what everybody commonly calls it, the BOVI. So, W.T. BOVI and the BOVI. Kind of cool, you know, you make something way back in history, your name is W.T. BOVI and everybody refers to your machine for years and years to come as the BOVI machine.

(1:21 - 1:36)

Just a little snippet into the history of that. Now I don't want to dive deeply into the anatomy of electricity because that's not what I want to talk about in this video. You know, atoms, electrons, matter, all that type of stuff.

(1:36 - 1:52)

You can read about that in a book. But let's talk about the definition of electro-surgery. And it's basically the application of an electric current to cauterise or coagulate tissue at the surgical site.

(1:53 - 2:18)

The current flows from a generator to a device or an active electrode that delivers the electric current to the surgical site through the patient or the tissue and it's channelled back to the generator via a dispersive inactive electrode or what we like to call just the grounding pad or the BOVI pad. So let's kind of break down that ESU circuit here. We have our generator.

(2:18 - 2:39)

This is on now and this is our generator. The active electrode, the BOVI that we'll actually be

using on the field is going to be directly plugged in. You throw that end off the field to your nurse and the nurse will plug it into the BOVI machine like this and now I have an active electrode.

(2:39 - 3:03)

See, I push the button and it will not let me use this because we do not have a grounding pad hooked up. This is our grounding pad. Now the grounding pad itself has this polyadhesive kind of electrode goo on it and when applying it to the patient, you always want to be applying it to the fleshy parts of the patient.

(3:03 - 3:45)

That means kind of like the thigh, buttocks area, the side of the patient or maybe upper arm are all kind of like the big fleshy areas on the human body that you want to place these grounding pads. So once that grounding pad is all hooked up and you have thrown off the tail end of this cautery, you will have an active electrode on the field that you can use to cut and coagulate tissue at the surgical site. As you activate the electrode by using one of the buttons on this BOVI machine, the power source itself will come from the generator down this wire all the way to the tissue of the patient.

(3:46 - 4:16)

It will go through the tissue of the patient down to the dispersive pad or the ground pad and it will go through the wire of the ground pad back to the generator itself. That is the electro-surgical unit circuit. Now something you may have noticed actually on this generator here itself, we have up and down for all of the cut, coag, and bipolar settings.

(4:17 - 4:52)

So cut and coag, the difference between these two is basically just going to be the amperage of electricity flowing through that active electrode at the field. If you need it to be cutting much more, you will turn the cut up or you will turn the coag up to a higher number and it will give you a much higher amperage of electricity flowing through that active electrode to help you really, really desiccate that tissue and cauterise what you need to cauterise. Same thing down here, we have different settings, desiccate, full grade, spray.

(4:52 - 5:18)

These are basically just different patterns of how the electricity is flowing out of the active electrode on the BOVI itself. Now what I was just talking about before with the ESU circuit, the active electrode, the generator, the active electrode, and the dispersive pad, that's all utilised for monopolar cautery. That is one single motion of cautery.

(5:19 - 5:39)

You're going from the generator through the patient back to the generator. Now bipolar is something entirely different. It's similar to the fact that it does coagulate tissue and cauterise the tissue, but it does that in between the two prongs of the actual forcep itself.

(5:39 - 6:05)

Let me see if I can get this in focus here. If you can see there, there it is, it's in focus. We have two little metal tips to the forcep itself and the electricity as it's arcing through these tips, the top one will be an active electrode and the bottom one will be the dispersive electrode.

(6:05 - 6:28)

So you actually don't even need a cautery pad on the patient's body itself. It actually does it all through the forcep itself and this whole forcep is the active electrode and the dispersive electrode. Now here are just a couple different examples of different devices that may utilise monopolar or bipolar cauterisation.

(6:29 - 6:43)

Starting off we have the robot spatula. This is a monopolar spatula that we utilise for robotic surgery to use to dissect and coagulate tissue. You'll see it a lot in robotic coles.

(6:45 - 7:13)

This is actually a laparoscopic instrument and this is just a monopolar scissor. Some surgeons may like a cold scissor and what that means is you're not going to be hooking up the monopolar cord to it that you see here on the end of it, the little knob. Others may like it hot so as they're cutting they're able to step on the foot pedal for the cauterisation and utilise that monopolar cautery as they're cutting through the tissue as well.

(7:14 - 7:24)

We have our bipolar forcep which I talked about with you before and lastly one more device. This is a suction cautery. It's basically a suction tip so it's an open hole.

(7:24 - 7:49)

You hook a suction tubing up to it and you can suck fluid through it but also at the end of it is a metal tip that has monopolar cautery to it so it can be utilised as suction and cautery at the same time. Now with every one of these different monopolar and bipolar devices there's also going to be a cord that comes with it. Some of them utilise the same cord, others do not.

(7:49 - 8:03)

For instance, the robotic cords are robotic specific. They're only utilised for robotic instruments themselves. As far as some of the other disposable supplies some of them may have their own

specific cord as well.

(8:05 - 8:23)

As far as generators go this one right here is probably going to be your most common. If you're working in a hospital that has nice big booms like this where you have insufflators and cameras and boving machines already on this whole big console that's great. And this is going to be the most common one that you're going to see.

(8:23 - 8:45)

It's just got your basic monopolar and bipolar hookups on this machine. But if you come over here we have a Ligasure machine. This Ligasure machine utilises monopolar, bipolar already hooked into the machine itself but it also has some separate hookups for the Ligasure supply as well.

(8:46 - 8:54)

That's going to be a whole different video. That's its whole separate thing. But it's a similar form of coagulation of tissue.

(8:54 - 9:08)

I'll talk about that another time though. And then over here we have our robotic console over here. So when you buy a robot obviously it comes with the surgeon's console, the robot and this huge tower over here.

(9:08 - 9:21)

But inside this tower we have the hookups for two monopolars and two bipolars. So these generators can come in all shapes and sizes. So that's essentially how the Bovee works.

(9:22 - 9:49)

Now obviously one of the scariest, scariest things to happen with any type of cauterisation is the possibility of an electrical burn. Now the reason we have that dispersive electrode is so we do not have any types of electrical burns. But if you improperly apply that pad and there is any open skin you can have an electrical burn.

(9:51 - 10:18)

I know from experience actually doing surgery and utilising a Bovee if there is a hole in your glove and you're Boveeing across your rubber glove you will feel an electrical burn, you will get a shock if you have a tiny, tiny pinpoint hole in your glove and you will feel it and it will hurt like hell. It will hurt so bad. I've seen it multiple times.

(10:19 - 10:49)

Surgeons basically jumping two feet away from the table because they just have a hole in their glove and they just burn themselves on their finger. It hurts so bad and it takes so long for something like that to heal because it's like a deep, deep thermal burn and you can feel that shock through your whole body especially if you don't have any type of dispersive electrode for the electrical current to go back to the generator. It's only the patient that is hooked up to that.

(10:49 - 11:11)

So if you, the surgical assistant or the surgeon get shocked with that Bovee man, it freaking hurts and it messes you up. And lastly I just wanted to talk about Plume. Plume is the term for the smoke that comes off of the tissue that's being burned.

(11:12 - 11:46)

Now I've read some articles that say cauterisation plume can be just as detrimental as smoking daily. So it's really important when you're at the surgical field and if you're an assistant to have that suction up there kind of sucking that plume smoke out of there so none of the people at the surgical field have to inhale that tissue plume as we're working. I think I'm going to do a specific video on Plume itself at a later point, but I just thought I'd have to put that in here.

(11:48 - 12:05)

As always, thank you guys so much for watching. All of the likes and the comments and the shares help out the channel exponentially for everybody out there that does that. It really, really helps get the videos out there and helps me spread these messages out to more and more people.

(12:05 - 12:09)

So thank you for that, and I will see you guys in the next video. Bye.