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Fluid Management in Hysteroscopic Procedures

Narrator:

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Dr. Zurawin:

This activity will discuss the most significant changes in hysteroscopic surgery today in both in-office and outpatient hysteroscopic procedures, in particular, those which have resulted in the need to reappraise the parameters of fluid absorption.

Dr. Miller and Mary Johnston, welcome to the program.

Dr. Miller:

Well, thank you, Dr. Zurawin.

Dr. Zurawin:

Dr. Miller, in your experience in hysteroscopic surgery, what steps should we take to minimize fluid loss?

Dr. Miller:

In the final analysis, I think it's important that we are always safe, so discussing fluid loss is really, at time of hysteroscopy, is really very important. First of all, in a hospital setting it's important to use the fluid management system that really accurately is able to evaluate the intrauterine pressure, and not just at the far end of the scope but rather pressure measured at the tip, at the front of hysteroscope. Now, obviously, as you know, in an office situation you may not have the luxury of a fluid management system, so in that case it's important that you accurately are able to correct your fluid so that you can measure loss. We utilize reusable canisters in that regard.

A second concept that we have is then you think about ways, well, what can we do to minimize loss? First of all, I use vasopressin. Vasopressin is a vasoconstrictor. I place 10 units of vasopressin in 30 cc of saline, and then we'll make a deep intracervical injection, of course remembering to aspirate because you don't want to get into blood vessels. I place 3 to 5 cc at 3:00 and 9:00.

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Dr. Zurawin:

Chuck, the vasopressin is really a key component for minimizing fluid loss but also blood loss. Do you wait a certain amount of time after the injection of vasopressin before you start your procedure?

Dr. Miller:

Rob, I've found that vasopressin acts pretty quickly, so by the time I create my injection and I place my vasopressin and I then go in and start dilating up my cervix to place the hysteroscope, I've had really plenty of time to be able to go ahead and see the acute vasoconstriction that is secondary to the vasopressin.

There are other points that I think, again, are very important. It's always important to use the lowest intrauterine pressure to allow adequate uterine distension. Now, we may go in at a higher pressure so that we are able to see the uterine cavity well, so I may start off at a higher pressure, but then I will back down and go as low a pressure I can go to adequately be able to visualize my pathology and to be able to treat my pathology.

The same goes when we talk about a safety feature, I think, in terms of minimizing loss is to limit repetitive hysteroscopic removal, because what that does is you go ahead, you have a nice cavity, you're seeing very, very well, then all of a sudden you take your hysteroscope out and now you're having to re-distend. And while you're re-distending, that fluid continues to be absorbed.

Dr. Zurawin:

Reinserting and removing the hysteroscope during a procedure is clearly something that we try to minimize, but when we do resection of tissue, either polyps or especially with fibroids, we're left with a lot of chips inside, and that often results in pistoning where we take some chips out, remove the hysteroscope, put the hysteroscope back, remove some chips. So, how do we try to minimize that either with a traditional loop or other devices so that we don't get into this problem you're talking about, which is repetitive removal and insertion?

Dr. Miller:

One of the ways that I do that is to make sure that I'm always visualizing the tissue that I'm working at. The last thing you want to do is basically cutting up your own chips and wasting time like that; efficiency is key. Another key is to make sure that your strips are long enough so that you're able to maximize the effort when you're going ahead and removing chips. Some people will go ahead and remove chips and will keep the outer sheath open, outer sheath inside as they're removing those chips. We have a tendency to go ahead and take out our scope and to use a polyp forceps, but, Rob, we only do that after we've really gotten to the point where our visualization is obscured.

Dr. Zurawin:

So, when you're doing your resections, how do you approach the pathology? Do you go side to side? Do you work on the surface? How do you dissect?

Dr. Miller:

And as you know, Dr. Zurawin, like you I also use a great deal of hysteroscopic morcellation, but whether you're using hysteroscopic morcellation or you're using a loop resectoscope, I think it's always important to work at the surface of the pathology. One of the things that we know is, is that the deeper one dissects into the myometrium, the larger the vessels are going to be and, therefore, the greatest risk of fluid absorption. The other advantage, you always work away from your point of, from your stock. The last thing you want to do is to dislodge your pathology, because then you're chasing after the tissue, and that in itself causes problems in terms of wasted time and subsequent fluid reabsorption.

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But even with all those safeguards, Dr. Zurawin, there are times when one is going to have bleeding from larger vessels, vessels deeper in the myometrium, and in those cases I will consider going after those vessels and gaining hemostasis.

Couple other things that we have when we get into some of the other points, avoid a bowel prep if possible preoperatively to reduce fluid absorption. Those vessels get hungry when you've had a bowel prep. Of course, stop, stop, stop, stop if there's rapid loss of fluid and poor uterine distension because you have to consider the possibility of a uterine perforation.

Dr. Zurawin, one of the things that a lot of us do when doing resectoscopy, when doing hysteroscopic morcellation, is because of visualizing the cervix we want to put that patient in Trendelenburg, but that may cause more problems with fluid leakage at the **buttocks drape*10:30**, so you've got to be careful about that. Also, putting a patient in Trendelenburg will put that patient at greater risk of air embolism, particularly if there's a lot of passages of that hysteroscope in and out and potential tears at the cervix.

Finally, ultimately you have 2 goals in the procedure -- number one, to take care of the pathology, to take care of that patient's problem, but ultimately, the second goal is to keep that patient safe, and that means a procedure may need to be done in 2 parts if there is concern about extensive excessive fluid loss.

Dr. Zurawin:

Well, Mary as a nurse, what steps does a nursing staff take to monitor fluid use during surgery? You know, the surgeon is consumed with visualization, resecting, but not always taking a look at really the fluid balance, so what does a nursing staff, what do you as a nurse, recommend doing?

Ms. Johnston:

Well, the first thing is definitely the fluid management system is key, and it has to be set up properly, so you just have to make sure that the person who's setting it up actually knows how to set it up correctly and that the suction is really strong to the system. You also want to make sure that the patient is properly draped with an under buttocks collection bag, not just a regular bag. Especially in the office, you need to make sure that you're getting a bag that you can drain and measure that fluid. And, also, you want to make sure that that is tucked really well under the buttocks. A little trick we do is we actually have the circulator pull it up around the patient so that it gets a really good seal underneath her bottom. And again, you want to be able to drain that bag and measure that fluid, so it has to have a port on the bottom of it so that you can actually hook that to suction.

The other thing we do is we collect the fluid on the floor. We use what's called sometimes a water bug, or we use these orange discs, and we connect those directly to the collection system, to the pump, if possible. If you cannot, then you can actually hook it to another suction and then subtract that from the deficit. I know that we have had 2 or 3 of those discs going at one time if it's a long case, and you never want to use towels or blankets to absorb that fluid.

What's always very important is to make sure there are extra bags of fluid and canisters available in the room so that the circulator doesn't have to run for more, because if you run out, the surgeon is pretty much shut down. He can't go on without his fluid or his suction, or hers. You should not dispose of empty bags or canisters as you are using them because sometimes you want to just make a double check of deficit, so just looking at how many bags have been used and how many canisters have been used during the case so we can kind of get an eyeball and make sure that that correlates with actually what we're seeing on the deficit, especially on big cases where you're using a lot of fluid.

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What I like to do also is just shout out every 100 or 200 cc of fluid loss. I will just announce it to the room so everyone knows.

Dr. Zurawin:

So, Mary, I know you're asking to notify the surgeon after every 100 to 200 cc of fluid loss, but what happens if the surgeon doesn't really want to listen and you're saying, “Well, okay, you’re reaching the maximum”? How do you convey that to the surgeon that you’re working on a borderline of fluid overload?

Ms. Johnston:

I would just mention to him that we are at the maximum, which we always use isotonic solution, saline, so 2,500 is what we stop at, so I just generally tell the surgeon, “Hey, we’re getting close to that amount. Do you want to consider an alternative method or maybe giving some furosemide?” or just letting him or her know that, yes, there's issues here.

Dr. Zurawin:

So, you mention furosemide, and that's a very useful drug to use when we're suspecting fluid loss. Do you ever use it for hypertonic solutions, just isotonic solutions, and if you do it, how do you monitor the patient's electrolytes?

Dr. Miller:

So, when it comes to furosemide, we're generally doing that with our isotonic solutions because we are much more rigid about using our hypotonic distension medium. If we get to about much over 1,000 cc, we are going to abandon the process. We are very concerned about that risk of hyponatremia. On the other hand, when we're dealing with isotonic solutions, we have more wiggle room. AAGL talks about 2,500 cc limit in terms of fluid loss, so we will go ahead and give 20 mg of furosemide if we're in that 2,500 to 3,000 cc mark in terms of fluid loss. We don't generally check electrolytes when we're dealing with an isotonic solution but are very diligent about checking electrolytes when we're dealing with a hypotonic solution.

Dr. Zurawin:

Now, that brings me to the question that I was going to ask you next, Chuck, which is the newer fluid management systems for hysteroscopic morcellators run at a higher flow rate and pressure because they need to keep the visual field clear when they're morcellating, so that increases the chance for increased fluid absorption. How do you deal with that during surgery? I know you're morcellating a fibroid or doing something like that and all of a sudden you open a vascular channel and you're working at 110 mm of mercury and all of a sudden, whoosh, you see that the fluid goes in really fast and all of a sudden you're at 2,500 cc and you've got a bunch of tissue left. What do you do?

Dr. Miller:

I think we're coming into the same point from 2 separate directions. I talked about the fact where having room with isotonic solutions to be at around 2,500, 3,000 cc and then acting and giving someone the furosemide. You talk about the fact that we're dealing with higher flow rate fluid management systems and all of a sudden having that increase in terms of fluid absorption. We're actually coming from the same point, and I think it is very important, it's crucial, as Mary talked about, that one is very, very on top of their fluid loss, that they are understanding how they're approaching their pathology, that they have a very thought-out plan in terms of what to do if indeed there is excessive fluid loss.

I must admit I have not had the same kind of concern as you with use of furosemide in terms of sodium loss when using an isotonic solution. I've always been more concerned about losing potassium, and why we generally in these cases will watch them somewhat

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longer than the average hysteroscopic patients postoperatively is to make sure with that fluid loss and even with the furosemide that they're not going to have any problems in terms of congestive heart failure or pulmonary edema.

Dr. Zurawin:

Okay, so let me circle back to something that Mary said, which is a critical point, do you have any additional recommendations for the nursing staff or the doctors in any of the fluid management systems and how you deal with them, low output, high output and so on?

Ms. Johnston:

Again, as you know, I think it's key for making sure it's attached correctly to suction. And sometimes the bag is not draining correctly, so you want to just make sure, and you'll have multiple surgeons a lot of times standing there so you can't see necessarily that the bag is draining properly, so that's the first place I would start looking. Another thing that I recommend is that people keep their saline or their fluids at room temperature because warm fluid can lead to increased absorption of the fluid. And if we have a big case coming where I see it's a big fibroid, I will tell anesthesia ahead of time so they know to watch the fluid, that there's going to be absorption in this case, they know to expect it. So, I think the key is, obviously if you have a team, that's the best thing, because the team knows how to do, connect that management system and to watch out for it.

Dr. Zurawin:

Chuck, what further steps should be taken if severe hyponatremia is noted? How do you treat severe hyponatremia?

Dr. Miller:

First of all, I always bring in a nephrologist. Hyponatremia does not occur in my practice very much, simply because I mainly use isotonic solutions as I'm doing hysteroscopic morcellation and using a bipolar resectoscope. Nevertheless, from time to time when I am using a monopolar resectoscope and I am using hypotonic solution, we may find profound hyponatremia. If that is the case, I will call a nephrologist. However, when discussing these cases with a nephrologist, often times we know that it is important to give, to utilize a hypertonic saline solution, 3% saline solution. We give our sodium back very slowly, 4 to 6 mEq/L, not to exceed 8 mEq/L in a 24-hour period. Rob, again, we watch that sodium closely, and we'll be measuring our sodium every 2 hours. A typical addition, a typical process, the way that the nephrologist will proceed is to give 50 mL hypertonic saline dosage over 10 minutes and, as needed, 2 to 3 additional boluses, but again, it is important not to exceed 8 mEq/L in a 24-hour period.

Dr. Zurawin:

I'd like to thank Dr. Charles Miller and Mary Johnston for talking with us today regarding fluid management in both in-office and outpatient hysteroscopic procedures and the critical role of the nursing team supporting these procedures.

Dr. Miller:

Thank you so very much, Dr. Zurawin.

Ms. Johnston:

Thank you, Dr. Zurawin.

Narrator:

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