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SUMMARY: Sarena and Kavya discuss five vignettes on first trimester bleeding with Dr. Sam Kempner, MD.

TIMESTAMPS:

00:37: **Dr. Sam Kempner Bio**

02:09: **Case 1: 18-year-old woman with intense abdominal pain and vaginal bleeding.**

05:06: **Case 2: 37-year-old woman with vaginal bleeding and pelvic discomfort.**

07:47: **Case 3: 23-year-old transgender man with light vaginal bleeding.**

10:25: **Case 4: 29-year-old woman at 11 weeks 3 days gestation with cramping pain and vaginal bleeding.**

14:25: **Case 5: 35-year-old woman at 13 weeks 4 days with decreased fetal movement.**

17:06: **Wrap-up**

LINKS:

Dr. Sam Kempner Bio

ACOG Early Pregnancy Loss Practice Bulletin

Hendriks, E., MacNaughton, H., & MacKenzie, M. C. (2019). First trimester bleeding: evaluation and management. American family physician, 99(3), 166-174.

Dugas, C., & Slane, V. H. (2021). Miscarriage. In StatPearls. StatPearls Publishing.

Dogra V, Paspulati RM, Bhatt S. First trimester bleeding evaluation. Ultrasound Q. 2005 Jun;21(2):69-85; quiz 149-50, 153-4. PMID: 15905817.

ACOG Bleeding During Pregnancy FAQ

ACR Appropriateness Criteria Second and Third Trimester Bleeding

NHS Bleeding in the Second Trimester of Pregnancy

UpToDate: Overview of the etiology and evaluation of vaginal bleeding in pregnancy

ACOG Second-Trimester Abortion Practice Bulletin

TRANSCRIPT:

Sarena: Hi everyone, welcome to UltraSounds, the podcast brought to you by OBGYN Delivered. I'm Sarena Gill.

Kavya: And I'm Kavya Davuluri.

Sarena: And we're the medical student hosts with this episode. Today we will be covering uterine bleeding during pregnancy with Dr. Sam Kempner.

Dr. Kempner is an Assistant Professor of Obstetrics and Gynecology at the University of Michigan. She received her medical degree from the University of Michigan and completed her residency training at Duke University Medical Center. She then joined Michigan Medicine faculty in 2012 as part of the Women's Health Division at Michigan Medicine. Dr. Kempner has been recognized for her outstanding teaching contributions to both the Medical School and the OBGYN Residency Training Program. Her clinical interests include family planning, obstetrics and minimally invasive gynecological procedures. She is passionate about providing health services to patients on an equal basis regardless of sexual orientation, gender identity, marital status and other non-medically relevant factors. In her free time, she enjoys both running for exercise and running after her two young daughters. On a personal note, Dr. Kempner is one of my faculty career advisors through the medical school, so it's so exciting to have you here with us today. Thank you for being here.

Dr. Kempner: Thank you so much for having me.

Kavya: Dr. Kempner, before we get started with recording our podcast episode we'd like to know what is your favorite podcast, if you have one?

Dr. Kempner: I was worried you'd ask me this because I noticed you asked it to the other people and truth be told, I'm a very old soul who does not really listen to podcasts. But I did listen to yours yesterday, and it's fabulous, so I would say it's my favorite podcast.

Sarena: That's high praise. We'll take it.

Dr. **Kempner**: With an n of 2, you guys are number one.

Sarena: Alright, so we're going to get started with our clinical questions about bleeding during pregnancy, the way that we structure this podcast, like our other content reviews, is going to be a question and answer format where I will present a clinical vignette, we'll ask Kavya to answer the question from a student perspective and then explore the clinician's thought process about additional pathophysiology, diagnosis, and treatment with Dr. Kempner. So with that let's get started with first trimester bleeding.

For our first patient, we have an 18-year-old, sexually active female who presents to the emergency department with intense abdominal pain and vaginal bleeding. Her HCG level is elevated to 3500 units per liter and she cannot recall her last menstrual period. Ultrasound shows no gestational sac within the uterus. What is the most likely anatomical location of this pregnancy? Kavya, what are your thoughts?

Kavya: Yeah, so the things that I pick up from the vignette are the elevated beta HCG which confirms pregnancy, abdominal pain, and vaginal bleeding, but the lack of an intrauterine pregnancy, all of these are concerning for an ectopic pregnancy which can be diagnosed based on an elevated beta HCG and a trans vaginal ultrasound which this patient has had. I know that the most common location for

implantation for a naturally conceived pregnancy that is ectopic is the ampulla of the fallopian tube, about 80% of the time, followed by the isthmus about 12% of the time, and then the fimbria about 6% of the time. So, my final answer is ampulla of the fallopian tube.

Sarena: Alrighty, thank you for talking us through that. Dr. Kempner, what additional thoughts do you have for this vignette?

Dr. **Kempner**: Well, I can tell that you studied your medical student level ectopic pregnancy skills because the question about the ampulla being the most common site of an ectopic pregnancy is tested and retested throughout your career. So you definitely nailed that one, and I think it's just important to have a high index of suspicion when there's a positive HCG and a reproductive age person with abdominal pain. I would consider an ectopic pregnancy until proven otherwise. I think the other important kind of clinical pearl is just when you hear the phrase abnormally rising HCG levels that should also trigger you to be concerned about an ectopic pregnancy, and when we think about abnormally rising HCG levels that's been a bit of a moving target. Over the years we used to talk about doubling of HCG in 48 hours, but really new evidence shows that a rise of 35% in 48 hours can be normal, so just learning. For this patient, I would not trend HCGs. This patient had a slam dunk ectopic pregnancy, but that other phrase that you'll see and think about is abnormally rising HCG levels.

Sarena: That's really helpful to know. I wasn't aware of the different rates that could still be clinically significant, and it a really helpful point to keep in mind when we're seeing patients with varying levels of HCG rise.

All right, let's move on to our next patient. A 37-year-old woman who presents to clinic due to vaginal bleeding and pelvic discomfort. Serum HCG is elevated greater than 100,000 and a pelvic ultrasound shows a central heterogeneous mass with scattered anechoic spaces and no identifiable fetal parts. What is the next best step in management? Kavya, what are your thoughts?

Kavya: Yeah, so anytime I see each super elevated beta HCG, like in this patient, I worry about gestational trophoblastic disease like a molar pregnancy. The most common cause of a complete molar pregnancy is the fertilization of an empty egg without chromosomes, which causes a duplication of the haploid genome of a single sperm without any sort of maternal genetic material. Complete molar pregnancies can be diagnosed in the first trimester based on a very elevated beta HCG as well as a snowstorm appearance on ultrasound, which is what we see in this patient case. They can sometimes also turn into gestational trophoblastic diseases that have the ability to invade the uterus or metastasize, so you have to do a suction curettage to clean out the uterus or even do a hysterectomy. And for bonus points, let's chat follow up. After a suction curettage, we put the patient on birth control to prevent another pregnancy, and then we follow up their weekly beta HCG to make sure that it didn't spike again, which would then be concerning for a gestational trophoblastic neoplasia.

Dr. **Kempner**: Excellent, I love that you did the bonus points that the follow up and not allowing another pregnancy to occur until you're absolutely certain this one has resolved. I think the other pearl would be just the difference between complete molar pregnancies and incomplete or partial molar pregnancies, and you defined complete perfectly. It's when a single sperm will fertilize an empty ovum and duplicate or two sperm will enter into an empty ovum, so that's completely paternal in origin, which is how I remember complete molar is completely paternal and then incomplete or partial molar pregnancy as a supposedly normal ovum gets fertilized by diploid sperm and those ones typically aren't quite as severe

of a presentation, the HCG levels won't be quite as high. The other thing to keep in mind is patients with molar pregnancy will often have very severe pregnancy symptoms due to their extremely high HCG level, so you'll see hyperemesis often in these pregnancies or like extreme nausea, vomiting at a very early gestational age, which should tip you off that maybe something is not quite right.

Sarena: That's really helpful, completely paternal is a complete molar pregnancy. I like that as a little memory technique. Thanks, Dr. Kempner.

Let's move on to our next patient. We have a 23-year-old G0P0 transgender patient presents to the emergency department with vaginal bleeding. The patient says that he was not expecting his period for another four days and has always been extremely regular. The patient states that the vaginal bleeding started two days ago, but it's remained very light. He also says the blood is brighter than his periods usually are. He doesn't endorse any abdominal pain, but does mention his breasts feel tender as they tend to around his period and that he feels bloated. The patient is sexually active with one cisgender male partner and inconsistently uses condoms. He has not yet undergone hormonal or surgical treatment in his transitioning. What is the most likely diagnosis for this patient Katia?

Kavya: Can I just pause for a second and say how refreshing this question is? I feel like in every exam question in vignette that I've ever seen, obstetric patients are always referred to by she/her pronouns, but it's really important to recall that not all pregnant patients identify as women and they could be trans or nonbinary or just otherwise not identify themselves by she/her pronouns. So that's great to see that this vignette is inclusive of another patient population.

That point aside, I am paying close attention to the fact that this patient hasn't started hormonal or surgical treatment in his transitioning process, which would definitely alter my differential. Otherwise, he says that this episode of vaginal bleeding is so light that it could possibly be considered spotting and that the blood is brighter than normal and a few days earlier than he expected his period. All of this considered, I think that this patient could possibly be experiencing implantation bleeding from a pregnancy.

Dr. **Kempner**: Excellent, I think the reason you're able to come up with implantation bleeding as your diagnosis is because you had such an excellent history because it really is a diagnosis of exclusion and this patient provided a very good history and a very thorough history was obtained so that you know the frequency of the periods and when one is expected and normal tracking of them because you don't want to write off any bleeding in early pregnancy that could be something more serious. And then the other really important registry is that this patient has not started on any hormonal gender affirming care which can impact the frequency of menstrual periods and obviously broaden their differential, but also an important caveat to know is that starting on hormonal therapy does not serve as birth control. So just because a transgender patient is on, testosterone does not mean that they cannot get pregnant. So should keep pregnancy on your differential for those patients as well.

Sarena: That's really important to note, I think when considering different patient populations so thank you for pointing that out, Dr. Kempner.

Our next patient is a 29-year-old G1P0 at 11 weeks, three days coming to clinic due to vaginal bleeding and crampy lower abdominal pain, beginning less than 12 hours ago. On exam, her cervix is dilated to 3

centimeters and there is a palpable mass protruding from the cervical os. The vaginal vault demonstrates gross blood. Ultrasound demonstrates no fetal cardiac activity. What is the diagnosis for this patient?

Kavya: Yeah, apart from the fact that we are in the first trimester and this patient has vaginal bleeding, the things that I am picking up most in this question are the cervical dilation and what sounds like the gestational sac probably being visible from the cervical os and the lack of fetal cardiac activity. I know that fetal death prior to twenty weeks of gestation is called a spontaneous abortion, while after 20 weeks is called an intrauterine demise. And when I think about that, there are six overarching types of spontaneous abortions that I would include in my differential before diagnosing this patient. And those include a threatened, missed, inevitable, incomplete, complete, and septic spontaneous abortion. And in this case an incomplete abortion is the one where the products of conception have started to protrude from the cervical os, but some fetal tissue remains in the uterus, so I think that that's what this patient is probably experiencing, is probably going through.

Dr. **Kempner**: Yeah, it's pretty clear at this point with the cervix dilated in the products in the os that this is incomplete and also inevitable abortion and at this moment in time I think it would be good to be ready to help the patient in that situation because these products could relatively easily be removed from the cervical os right there in the office using something like ring forceps steps and provide a lot of relief to the cramping. If they're experiencing, I mean, you can imagine cervical dilation, it feels very, very crampy, so having 3 centimeters of dilation with products of tissue in the office is going to be very uncomfortable and is a risk for infection and further bleeding. So right there and then in the office, you could help this patient out by just gently grasping and removing the tissue, and then maybe all the intervention that they need.

Sarena: Dr. Kempner, can you talk us through a little bit more about the different types of abortions that Kayva mentioned?

Dr. **Kempner**: Yeah, absolutely. So the most common type and benign type of spontaneous abortion is called a threatened abortion, and this is one where the patient presents with vaginal bleeding, but the cervix remains closed and the fetus continues to have cardiac activity. So this is basically somebody that just calls your office and tells you they're bleeding and you do ultrasound for reassurance that they're still pregnant. The threat of an abortion, but it hasn't happened, and it may not happen and in the other types of abortions there's no fetal cardiac activity, so a missed abortion is one where the patient could have missed the fact that they've been experiencing an abortion because they did not have any symptoms, so they had no bleeding and the os would be closed. But when they present to clinic the ultrasound shows a fetal death in the uterus and this is often diagnosed at the first OB intake appointment somewhere between 8 and 10 weeks along. And then inevitable abortion is exactly that. It's inevitable, there's bleeding and the cervix is dilated and the fetal tissue has not passed through yet, but it inevitably will. Kavya walked us through an incomplete abortion, which is sort of one step further than inevitable abortion where the products are starting to come through the os but have not completely been expelled. Finally, a complete abortion is where all products of conception have passed through the cervix. The cervix is closed and no fetal tissue remains in the uterus, the process is complete. You should also never forget septic abortions, which are an infection of the uterus during a spontaneous abortion process that will present with fever, elevated white count, purulent cervical discharge.

Sarena: Thank you for talking us through those different factors. I feel like one thing as a student, when I was learning the different types of spontaneous abortions, and was having trouble trying to figure out

how to differentiate between them and also what the indicated management would be at that time, so that's helpful to kind of layout.

We'll move to our next patient, a 35-year-old G1P0 at 13 weeks, four days who comes to triage due to decreased fetal movement. She denies any vaginal bleeding and an ultrasound shows absent cardiac motion and the diagnosis of a missed spontaneous abortion is made. What is the next best step for this patient?

Kavya: Yeah, I think obviously this is a podcast on 1st trimester uterine bleeding, and I think that despite the fact that this patient isn't bleeding, the point is to really drive home the spectrum of spontaneous abortions. So in this case, the biggest thing that I'm considering is how early we are in the pregnancy and what is safest for the mother. I know that misoprostol and mifepristone can be used for medication abortion until about 12 weeks and six days, but after that we really can't rely on medication. So since she's still fairly early on in her gestation I would recommend a dilation and curettage instead.

Dr. **Kempner**: Yeah, this this sends a hard case because you wouldn't know exactly how far along she is. Unless you did ultrasound measurements and it's possible that you could still use medical management of pregnancy if the pregnancy measured less far along if she'd had a missed abortion a few weeks prior, then you could offer medical management, but once you're onto the second trimester we generally do recommend a dilation and curettage for patients. And I think the important thing to remember with medical management of miscarriage is that the mifepristone, which is a progesterone receptor antagonist, can really increase the efficacy of the misoprostol which is a prostaglandin. If you give just misoprostol, your chance of success is probably somewhere around 70-75%. Where if you add in mifepristone prior to the misoprostol you can get medical success rates up over 90% of the patients not requiring going on to surgery for management of their miscarriage.

Sarena: That's really helpful to think about, especially in terms of remembering a patient might present at a certain time where you think you know the gestational age, but depending on the time of the abortion, especially if there was a missed abortion, being mindful that different methods might be available for treatment and management moving forward.

Kavya: Dr. Kempner, I had a quick nonclinical question as we wrap up this episode. According to ACOG, it's estimated that as many as 26% of all pregnancies and 10% of clinically recognized pregnancies end in miscarriage. In addition, 80% of early pregnancy loss occurs in the first trimester, with the risk decreasing after about 12 weeks of gestation, how do you approach counseling a patient that might be experiencing a miscarriage or spontaneous abortion in their first trimester?

Dr. **Kempner**: Oh, so hard. I mean, it is so common, but it doesn't get any easier. I think the best thing you can do is just reassure them that this is not their fault and explore the beliefs as to why they think it happened because people have all these thoughts in their heads and things that they know sound silly and that they don't want to admit but they ate something or they exercised, or they had intercourse, or they stood too close to a microwave or anything you could think of. So just to like, let them air those things and to reassure them, can provide comfort that there's nothing they could have done differently. But then also depending on their headspace and kind of how they're feeling about it, offering to get them some answers. So doing some testing if appropriate, like in the patient where we will remove the products of conception from the os, offering genetic testing to see if you can get an answer as to why this happened to help them move forward and offer to partner with them. Some of the best

relationships I've formed with patients have sadly been after a bad outcome then when they go on to have a healthy pregnancy, it could be really satisfying if they really felt like you were there for them in their moment of need.

Sarena: It's really helpful to think about. Also, as a provider, remembering that you know after these really challenging moments, that patients might experience, there are still opportunities to have these healthy pregnancies that they may be seeking, and also just knowing overall how to manage and counsel your patients so that they're heard and validated in the things that they're feeling and experiencing. Dr. Kempner, having your insights as a clinician is so valuable for those of us learning about how to approach OBGYN patient scenarios. Thank you so much for taking the time to join us for this episode today.

Dr. **Kempner**: It was really fun. Thanks for having me and I hope you have me back for something more lighthearted next time. These are some heavy topics that we discussed today.

Sarena: We'll be sure to have you back.

Kavya: We'd love to.

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