

FIRST TRIMESTER VAGINAL BLEEDING: PEARLS & PITFALLS

BY MICHELE CALLAHAN, MD

First trimester vaginal bleeding occurs in up to 25% of all pregnancies, and about 50% of these will proceed to miscarriage. These patients may or may not be aware that they are pregnant.

Differential Dx: ectopic pregnancy, miscarriage, implantation bleeding, molar pregnancy, PID/cervicitis, trauma such as cervical lacerations.

Pearl: All women of child-bearing age with abdominal pain and/or vaginal bleeding have an ectopic pregnancy until proven otherwise.

Ectopic pregnancies account for 2% of all pregnancies but are the leading cause of first-trimester pregnancy-related deaths. This number is doubled to 4% in patients who underwent assisted reproductive technology (ART) such as in-vitro fertilization. The prevalence of ectopic pregnancy amongst all patients who present to the ED with first trimester bleeding or pelvic pain is up to 16%. It is common for patients to have a delay in diagnosis beyond their first visit; this occurs in up to 40% of cases. Although there are risk factors for developing an ectopic pregnancy, up to 50% of these patients have no risk factors.

Pearl: Free fluid in the abdomen with a positive b-hcg (regardless of the value) and no visible IUP is a ruptured ectopic until proven otherwise.

A bedside FAST exam is helpful in evaluating for free fluid in a patient who has a concerning, unstable presentation. Up to 1/4 of tubal ectopic pregnancies will rupture. This can also occur after the patient has been treated with methotrexate; a patient may present with sudden, worsening abdominal pain and/or heavy bleeding. Have a low threshold to contact OB/GYN or transfer the patient to a facility where they can receive consultation and operative management.

What workup is appropriate when evaluating first trimester vaginal bleeding?

It is helpful to obtain a b-hcg (serum quantitative), ABO/Rh (with crossmatch if concern that the patient is unstable), a urinalysis, and strong consideration should be given to ordering a pelvic/transvaginal ultrasound. A pelvic examination should be performed to check for any obvious sources of bleeding, to assess whether the cervix is open or closed, and to look for any products of conception. The presence of clot or tissue within the cervix may prevent the os from closing and will lead to continued bleeding.

Cont'd on page 5

IN THIS ISSUE:

- P. 1** First Trimester Vaginal Bleeding
Pearls and Pitfalls
- P. 2** Who Needs It!
ECMO in COVID
Myocarditis in Athletes
- P. 3** Kawasaki Disease for the EM provider
Don't Risk It!
Good Advice for Bad Situations
- P. 4** Feedback and Evaluations
Getting Your Pictures Right
Memos from the Mullet
Magical Thoughts
- P. 5** "I've Got the Rona -
Can I Get the New Stuff?"
Use of Bamlanivimab

CONTRIBUTORS

EDITORS

Abena Akomeah, MD
Priya Kuppusamy, MD

LAYOUT & DESIGN

Rhamin Ligon, MD

AUTHORS

Abena Akomeah, MD
Michele Callahan, MD
Brandon Cole, MD
Kelsey Johnson, DO
Priya Kuppusamy, MD
Rhamin Ligon, MD
Amanda Quiller, PA-C
Tejusve Rao, DO
Jaron Santelli, MD
Brad Schwartz, MD

Who needs it! ECMO in COVID

Tejusve Rao, DO

SARS-CoV-2 is known to cause Acute Respiratory Distress Syndrome (ARDS) requiring prolonged mechanical ventilation. Having a predilection for attacking the lungs, COVID-19 leads to acute hypoxic respiratory failure in about 2-20% of people affected. Though various strategies have been employed to improve hypoxemia, a subset of those patients may develop refractory hypoxemia, ARDS, hypercarbia, acidosis, right ventricular failure and/or cardiogenic shock. These patients may benefit from either venovenous (V-V) or venoarterial (V-A) extracorporeal membrane oxygenation (ECMO).

- **Consider V-V ECMO for COVID-19 patients with refractory ARDS**
- **Consider V-A ECMO for COVID-19 patients with refractory cardiogenic shock**
- **Refer to the American College of Cardiology for contraindications and restricted use for systems operating at expanded capacity and near saturation**

The ELSO (Extracorporeal Life Support Organization) guidelines for the indication for V-V ECMO are:

- **$\text{PaO}_2/\text{FiO}_2 < 60 \text{ mmHg}$ for $> 6 \text{ hours}$ OR**
- **$\text{PaO}_2/\text{FiO}_2 < 50 \text{ mmHg}$ for $> 3 \text{ hours}$**
- **$\text{pH} < 7.2 + \text{CO}_2 > 80 \text{ mmHg}$ for $> 6 \text{ hours}$**

Although COVID-19 has been mainly shown to cause severe respiratory disease, cardiovascular complications such as myocarditis, cardiomyopathy, acute coronary syndrome, and cardiogenic shock have been well established. The indication for V-A ECMO is:

- **Refractory cardiogenic shock with persistent tissue hypoperfusion (Systolic Blood Pressure $< 90 \text{ mmHg}$, Cardiac Index $< 2.2 \text{ L/min/m}^2$ while on norepinephrine $> 0.5 \text{ mcg/kg/min}$, dobutamine 20 mcg/kg/min or equivalent)**

A recent study from *The Lancet* in October 2020 used data from the ELSO registry with confirmed COVID-19 patients who had ECMO support. The study included 1,035 patients with COVID-19 who received ECMO. In those patients, estimated mortality at 90 days after ECMO was slightly less than 40%. This is consistent with previous mortality rates in non-COVID-19 patients with ARDS and acute respiratory failure on ECMO. This data provides support for the use of ECMO in appropriate patients with COVID-19. Since ECMO is a highly complex, labor intensive and expensive process, patients who qualify for ECMO should be quickly identified and transferred to specialized tertiary care centers.

Myocarditis in Athletes

Jaron Santelli, MD

COVID-19 has been associated with significant morbidity and mortality including cardiovascular sequela such as myocarditis. 22% of hospitalized COVID-19 patients have elevated troponins and abnormalities on their echo compared with 1% in non-COVID viral infections. This diagnosis becomes even more important when we look at athletes.

One of the initial theories of cardiac disease in COVID-19 described infiltration of inflammatory cells causing myocarditis. However, recent autopsy studies show viral infection of myocytes and a cytokine response as the cause. This process can result in cardiac dysfunction, arrhythmias, and death. According to a recent article in *JAMA Cardiology*, exercise in an athlete may result in "accelerated viral replication, increased inflammatory response and cellular necrosis." For athletes with COVID-19 myocarditis, exercise restrictions should be imposed for 3-6 months, followed by risk stratification based on EKG, labs, echocardiogram, cardiac MRI (CMR), and stress testing to determine if they are cleared to resume sports activity. Initial ED work up should include EKG, basic labs, inflammatory markers such as, ESR and CRP, BNP, troponins, and an echocardiogram. Cardiac MRI should strongly be considered during hospitalization or as part of an outpatient work up. A recent study showed that of 26 elite collegiate level athletes who had tested positive for COVID-19 (both asymptomatic and symptomatic), 15% had CMR evidence of active myocardial inflammation despite normal cardiac structure and function on echocardiography and normal serum troponin levels.

Abnormal findings in acute myocarditis can include elevated troponins, elevated BNP, EKG findings of diffuse T-wave inversions and saddle-shaped ST-segment elevations, and echocardiogram findings of ventricular hypokinesis, decreased ejection fraction with thickened septum/ventricular walls. CMR may show myocardial edema as well as myocardial injury.

Follow up for athletes who present with findings concerning for myocarditis in the setting of COVID-19 should include a referral to sports medicine and sports cardiology if they do not require hospitalization. These patients should be held from all physical activity until cleared by a specialist.

For COVID-19 positive athletes who are asymptomatic, a 2-week period of no exercise is advised. These asymptomatic athletes can slowly resume exercise under the guidance of a health care team after that. Those athletes who are COVID-19 positive with mild symptoms are advised to have 2 weeks of no exercise after symptom resolution and then evaluation by a medical team before return to exercise. The evaluation will include, but is not limited to, EKG, troponin, and an echo.

KAWASAKI DISEASE

for the EM provider

Kawasaki Disease (KD - mucocutaneous lymph node syndrome) is the leading cause of acquired heart disease in developed countries, second to rheumatic heart disease. It has an unknown etiology but thought to be a final common pathway in susceptible hosts from various sources of infection. It affects children ages 6-60 months, though most commonly seen in children 18-24 months of age. Affected children may present with fevers, extreme irritability, aseptic meningitis, GI upset, arthralgias or myalgias. Untreated, these fevers last 12 days on average, and are often resistant to anti-pyretics. Coronary artery lesions develop in 25% of untreated children but drop to 2-3% in those who are appropriately treated. As a result, early recognition and initiation of treatment is crucial.

CLASSIC KD

Clinical diagnosis characterized by acute febrile illness (typically $>39^{\circ}\text{C}$) lasting at least 5 days and accompanied by **at least 4 of the following criteria**:

- **Bilateral non-exudative conjunctivitis** sparing the limbus (most common finding)
- **Rash** that often begins in groin and becomes diffuse (erythematous and maculopapular, but can take many forms)
- Anterior, unilateral **cervical lymph node enlargement** ($>1.5\text{cm}$) = least common finding
- Erythematous oropharynx, **mucositis**, and "strawberry tongue"
- **Erythema/edema of hands/feet**, or periungual desquamation (late finding)

REMEMBER... CRASH + BURN!

Conjunctivitis
Rash
Adenopathy
Strawberry tongue
Hands/feet erythema or edema

(+) "BURN" for fever

INCOMPLETE KD

Patients with Incomplete KD have the same clinical course and risk of CV complications as those with Classic KD. The only difference is that patients with Incomplete KD lack a sufficient number of criteria for the diagnosis of Classic KD.

The diagnostic pathway for Incomplete KD:

Child of any age with fever ≥ 5 days and 2-3 of the Classic KD criteria **OR**
Child < 6 months with unexplained fever ≥ 7 days

obtain labs

CRP $\geq 3\text{mg/dL}$ and/or ESR $\geq 40\text{mm/h}$ **

At least 3 of the following labs:

- WBC $> 15\text{k}$
- platelet $> 450\text{k}$
- pyuria (sterile)
- anemia (normocytic, normochromic)
- elevated ALT
- albumin $< 3\text{g/dL}$

Admission/transfer for continued evaluation and cardiac ECHO

**If inflammatory markers are normal but high clinical suspicion, consider admission for serial exams, labs, +/- cardiac echo

MIS-C in the COVID ERA

Multisystem Inflammatory Syndrome In Children is a rare complication of pediatric SARS-CoV-2 infection that presents very similarly to KD with fever $\geq 24\text{h}$, elevated inflammatory markers, ≥ 2 organ system involvement in the setting of active or recent COVID-19 infection. Etiology thought to be immune mediated vasculopathy. Some unique features of MIS-C:

- More common in adolescents rather than young children
- More common in Black/Hispanic patients rather than Asian patients
- More than half of documented cases required vasopressor support for severely depressed cardiac function
- GI upset is common

Click this link to the [CHOP MIS-C Clinical Pathway](#) for an on-shift guide for MIS-C evaluation.

TREATMENT & DISPOSITION

- **IVIG** 2g/kg given over 12 hours
- **ASA** 20mg/kg q6h
- +/- steroids for COVID-related MIS-C
- Obtain baseline cardiac **echo**
- Consider pediatric **cardiology consult** as risk of aneurysmal formation greatly increases after 10 days without treatment which may affect PICU vs floor admission

CAUTIONS

- Maintain a high index of suspicion in children presenting with several days of unexplained fever.
- If discharging these patients, provide anticipatory guidance for return and re-evaluation if the fever persists for 5 days.
- A concomitant infection such as UTI, viral illness, PNA is often present and does not preclude the diagnosis of KD.

DON'T RISK IT!
good advice for bad situations

clinician vulnerable to criminal investigations and litigation that may not be covered by malpractice insurance. Keep the following pearls and pitfalls in mind during your next patient encounter:

- **Communicate.** While many patients tend to consult Dr. Google prior to their ED visit, they don't typically read books like *Bates' Guide to Physical Examination*. A rectal exam in a patient presenting with bilateral leg weakness may seem quite obvious to the clinician, but it may come out of left field from a patient's perspective. Explain what you are about to examine and why. Describe what the exam entails, especially if it involves sensitive areas including the breasts, buttocks or genitalia.
- **Check** surroundings to ensure patient has privacy prior to the exam. Shut doors, make sure windows are covered and curtains are closed. Lower your voice when speaking and let the patient know you are making every effort to ensure privacy. This becomes especially important in "Curtainsville", where patient rooms are separated only by curtains.
- Utilize **chaperones** whenever examining sensitive areas, even if the patient is of the same sex. Be sure to document that a chaperone was present during the exam.
- Show **compassion**. Keep in mind that patients have different experiences that may influence how they perceive the physical exam. They may have gone through a traumatic event in the past (such as sexual assault) and the physical exam could bring up painful emotions and memories. They may also be unfamiliar with having a "stranger" examine sensitive areas of the body. Good communication (see first pearl) and patience can go a long way in these circumstances.

Coming in February... Look for the next issue of "Approach With Caution!" focusing on informed consent and refusal.

'TIL THEN, *Rhamin & Priya*
Rhamin Ligon, MD & Priya Kuppusamy, MD

Feedback & Evaluations

getting your pictures right

The process of delivering effective feedback and evaluations can be surprisingly challenging. To truly get a better understanding, we should ditch the digital age and revert to the analog days. Providing an effective, constructive feedback on performance is a lot like taking and developing a picture.

To start off with, what is the importance of the performance review being generated? You wouldn't take a picture on a camera using a landscape format for a portrait, and vice versa. Similarly, with feedback and evaluations, we should strive for the same clarity of purpose: to drive learning and growth, reinforce good habits and enact change in performances that need improvement.

Our pictures should have a theme. What is the message or image we would like to convey? While some feedback can be given on the fly, an effective framework requires some forethought, a good setting and backdrop. Sometimes a haphazardly planned selfie can have real value, but frequently shooting an impromptu picture ends up with inevitable tones of blurriness and may not convey the educator's intentions in the best light.

In our medical education culture, appearing competent is of high value and thus receiving any type of feedback may be perceived as an indicator of incompetence. Similarly, too many areas of critique generate the misconception of a 360-degree, ambush mode of attack where borders close down and walls come up. The end result resembles more of defeat than victory; instead of helping the learner to improve, you have now cut communication lines. Here are some tips on delivering effective feedback:

- **Set the expectation early that feedback will be given. Address the following at the beginning of shift:**
 - *Learner's goals and areas of focus for improvement*
 - *Share your goals and how you can help*
 - *Inform the learner when and how you will give feedback*
 - *Ask learner to give you feedback*
- **Communicate and show that you have the learner's best interest at heart.**
- **Effectively model the behavior you expect to see in the learner.**
- **Observe the learner before giving feedback.**
- **Seek a private location with good lighting for feedback.**
- **Ask for learner's self-assessment first, e.g. How do you think you did?**
- **Prepare for emotional response if the feedback might include areas they need to improve on.**
 - *Try the "feedback sandwich"; constructive feedback sandwiched between positive comments.*
 - *Keep in mind that too much fluffy bread and too little meat can make a poor sandwich.*
 - *Try to deliver what you feel is a fair mix of positive and constructive feedback.*
- **Finally, don't leave them hanging! Help learners identify strategies to improve on the gaps identified.**

Abena Akomeah, MD & Brad Schwartz, MD

GOOD JOB



Memos from the Mullet: Magical Thoughts

In all transparency, this article was planned as a review of COVID airway management. But as I began collecting resources, I found an article titled *COVID-19 Pandemic and Non-invasive Respiratory Management: Every Goliath Needs a David. Somehow, seeing David and Goliath* got me thinking about the legend of Samson. And the legend of Samson got me thinking about my current luxurious locks, and the reason they continue to flourish (despite protests on the home front).

Safety. Yup, that party in the back is singlehandedly responsible for my safety thus far throughout the pandemic.

Matthew Hutson, in his book, *The 7 Laws of Magical Thinking: How Irrational*

Healthy, and

thinking down

1)Objects carry

knows no

have power,

consequences,

6)The world is

happens for a

focus on the

having direct

consequences.

Specifically, the effect of

commenting on the state of the department.

Step into any Emergency Department and drop the **Q-BOMB**,

and you'll immediately be met with groans, eye rolls, and, if

you're at PG Emergency Department, threats to your well-

being. Surprisingly, this most pervasive of ED superstitions has

had multiple attempts at validation and the results may surprise

you: **There's no evidence to support it!**

• Brookfield et al: In a single center, prospective,

randomized, non-inferiority trial, that took place in a

microbiology lab, the workload was compared on days

that began with the phrase "today will be a quiet day" vs

days where the Q-word was banned. Confounders (full

**Irrational
beliefs keep
us happy,
healthy,
and sane...**

Beliefs Keep Us Happy,

Sane, breaks magical

into 7 categories:

essences, 2)The mind

bounds, 3)Symbols

4)Actions have direct

5)The soul lives on,

alive, and 7)Everything

reason. So today, we'll

concept of actions

having direct consequences.

Specifically, the effect of

commenting on the state of the department.

Step into any Emergency Department and drop the **Q-BOMB**,

and you'll immediately be met with groans, eye rolls, and, if

you're at PG Emergency Department, threats to your well-

being. Surprisingly, this most pervasive of ED superstitions has

had multiple attempts at validation and the results may surprise

you: **There's no evidence to support it!**

• Brookfield et al: In a single center, prospective,

randomized, non-inferiority trial, that took place in a

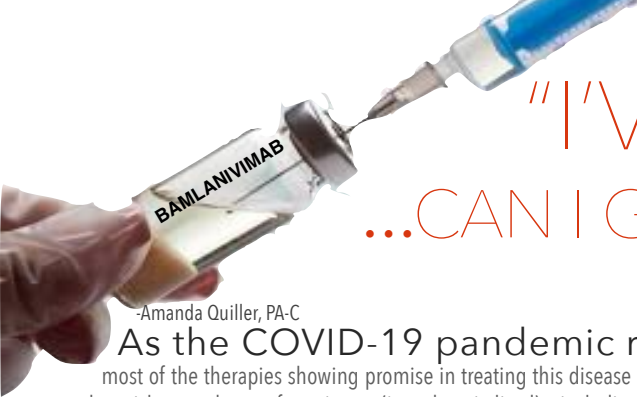
microbiology lab, the workload was compared on days

that began with the phrase "today will be a quiet day" vs

days where the Q-word was banned. Confounders (full

Brandon Cole, MD

Take care y'all,
Brandon



"I'VE GOT THE RONA ...CAN I GET THAT NEW STUFF?"

-Amanda Quiller, PA-C

As the COVID-19 pandemic rages on, most of the therapies showing promise in treating this disease are being used for the sickest subset of patients (i.e., hospitalized), including remdesivir and dexamethasone... until now. Introducing... BAMLANIVIMAB... Bamlani...What?

WHAT IS IT? Bamlanivimab, is an IgG1 monoclonal antibody that binds to the receptor-binding domain of the spike protein on the viral surface. This is essential for viral binding and entry into human cells. The antibody was initially isolated from the convalescent plasma of a patient with COVID-19 and has just received Emergency Use Authorization (EUA) by the FDA on 11/9/2020, based on interim phase 2 clinical trial (BLAZE-1) results recently published in the New England Journal of Medicine on 10/28/2020.

WHAT DOES IT DO? Preliminary analysis shows promise that the drug may decrease viral load of infected patients within 3-7 days of administration, compared to patients not receiving the drug. It may also decrease the frequency of hospitalization, especially in patients who are ≥ 65 years old or patients who have a BMI of ≥ 35 , which is possibly secondary to earlier viral clearance. It may also decrease COVID-19 symptoms experienced by patients who receive it, especially in high-risk patients.

WHO CAN GET IT? Dischargeable patients (mild to moderate symptoms, not requiring supplemental oxygen due to COVID-19) with confirmed SARS-CoV-2 infections, at least 12 years of age and ≥ 40 kg in weight with at least one risk factor (see table) for progression to severe COVID-19 disease.

HOW DO WE GIVE IT? Bamlanivimab should be given as soon as possible (within 10 days) after symptom onset. The approved dosage is 700mg IV infusion given over at least an hour. Side effects are generally mild and most commonly include GI upset (N/V/D) and infusion-related reactions.

Age	Any Age	12-17	≥ 55	≥ 65
RISK FACTORS	BMI ≥ 35	BMI ≥ 85 th %ile for age/gender based on CDC growth charts	Cardiovascular disease	≥ 65 yo is an independent risk factor
	CKD	Sickle cell disease	Hypertension	
	DM	Heart disease	Chronic lung Dz	
	Immuno-suppression	Neurodevelopmental disorders, e.g., Cerebral palsy		
		Medical device dependence, e.g. (trach, g-tube), or PPV not COVID-19 related		
		Chronic lung Dz requiring daily control medication		

PROS? This is one of the first potential treatments for dischargeable patients with mild/moderate COVID-19. The US Government will allocate the first 300,000 doses of the medication without passing out-of-pocket cost to the patients.

CONS? The change in viral load at day 11 compared to day 1 was assessed using nasopharyngeal swabs, which may not be reflective of viral load within the lower respiratory tract. Different medication doses were used, muddying some of the results of the observed outcomes. The study included only 7.2% African American patients, despite African Americans disproportionately developing severe COVID-19 disease. Also, the EUA is approved for only 300,000 treatment doses so we run the risk of running out of medication. Access is also limited, with only a few local centers, including the Baltimore Convention Center and Washington Adventist Hospital, distributing it to our population. Physicians must complete a referral form before a patient can receive the infusion. Without the availability of rapid COVID-19 testing for dischargeable PUIs, its potential for use will be significantly limited in outpatient settings such as the Emergency Department.

Vaginal Bleeding - Cont'd from page 1

Pitfall: Failing to obtain an ultrasound because the hcg quant is very low or below the discriminatory zone.

An accurate gestational age calculation (and NOT the hcg level) is the best determinant of when a normal pregnancy should be seen on transvaginal ultrasound. The gestational sac is expected around 4.5-5 weeks, the yolk sac around 5-6 weeks, and the embryo with fetal cardiac activity should be seen around 6-6.5 weeks.

Ectopic pregnancy (and rupture) can occur at very low hcg levels. Up to 7% of ruptured ectopics occurred with hcg levels < 100 . By definition, these pregnancies are abnormal and do not follow the "rules". This is why a pelvic ultrasound should be obtained, even if the quantitative b-hcg is very low or below the discriminatory zone, when evaluating a patient for ectopic pregnancy.

Pearl: In order to diagnose an intrauterine pregnancy, there must be a gestational sac PLUS a yolk sac or fetal pole in the uterus.

Pitfall: Mistaking a pseudo-gestational sac for a true gestational sac.

A true gestational sac can be distinguished from a pseudo-gestational sac by the presence of a double decidual sign and/or the presence of an associated yolk sac. It is often located eccentrically and embedded within the endometrium as opposed to centrally within the intrauterine cavity. Pseudo-gestational sacs can be found in up to 20% of ectopic pregnancies, so it is important to not be fooled.

Pitfall: Using a single b-hcg value to diagnose viability.

Unfortunately, 1 in 3 women will experience a miscarriage, which is a pregnancy loss before 20 weeks. Approximately 80% of miscarriages occur before 13 weeks, and these are most often due to chromosomal abnormalities. A single hcg cannot diagnose viability; serial hcg measurements are needed to differentiate a normal pregnancy from an abnormal pregnancy. There are ultrasound findings that may be diagnostic of pregnancy failure, but often serial ultrasounds are required to diagnose a nonviable pregnancy. Some findings that may signal a pregnancy failure include: CRL > 7 mm without a heartbeat, mean sac diameter > 25 mm without an embryo, and absence of an embryo with a heartbeat > 2 weeks after a scan showing a gestational sac without a yolk sac. If an ultrasound is nondiagnostic, repeating it within 7-14 days is appropriate.

Pitfall: Failing to adequately counsel patients about possible outcomes and the need for follow-up.

In order to appropriately counsel our patients, it can be helpful to know the following: the miscarriage rate for all-comers < 12 weeks with vaginal bleeding is approximately 50%. Not all first-trimester bleeding is due to miscarriage, and women may go on to have a completely normal pregnancy. If the cervix is closed, there is mild bleeding, and there is a heartbeat on TV US, the risk of miscarriage drops closer to 10%. If there is subchorionic bleeding on US, there is up to a 25% risk of subsequent miscarriage (although many of these will resolve on their own).

If a patient has a positive pregnancy test and is stable but US does not show an IUP, they should return in 48 hours for repeat hcg testing.