Postpartum hemorrhage:

- Data on the incidence of PPH in covid19 is limited.
- There are no specific recommendation for the management of patient with pph with covid19.
- Perevantion of PPH is recommended more aggressively compared to non covid.
- Blood transfusion is more difficult because it may be harmed by local protocolsto cross match using the same machine as non covid.
- No specific difference between covid and non covid.

BLOOD LOSS >500 mL AT VAGINAL DELIVERY OR >1000 mL AT CESAREAN DELIVERY BUT <1500 mL WITH ONGOING EXCESSIVE BLEEDING

- **Establish adequate intravenous access**
- **Resuscitate with crystalloid and blood:**

Close monitoring of hematocrit, coagulation status, core temperature, and electrolytes is essential when rapid infusion of large volumes of crystalloid (eg, >3 to 4 L) are given since this may promote dilutional coagulopathy, electrolyte imbalances, and hypothermia.

As a general rule, progressively increasing heart rate and dropping blood pressure in any obstetric patient indicate ongoing bleeding and should be treated as such. This means aggressive blood and blood product transfusion, regardless of whether or not abdominal examination or ultrasound suggest intraabdominal bleeding (which may be concealed

- **Examine the lower genital tract and uterus to determine the cause of bleeding**

- **Administer tranexamic acid:**

Delay in treatment, even if short, reduces the benefit of tranexamic acid administration.

One gram (10 mL of a 100mg/mL solution) is infused over 10 to 20 minutes, as infusion >1 mL/minute can cause hypotension. If bleeding persists after 30 minutes, a second 1 g dose may be administered.

The antifibrinolytic effect lasts up to 7 to 8 hours in serum.

We are not administering tranexamic acid prophylactically.

- Tranexamic acid recommended in PPH with covid.

- **Administer additional uterotonic drugs:**

Oxytocin

Methylergonovine

carboprost tromethamine

Transfuse red blood cells, platelets, plasma

- Replacement of blood components is more important than crystalloid infusion if massive hemorrhage has occurred or is likely
- In a postsurgical patient who repeatedly drops her blood pressure and/or urine output despite reasonable volume replacement, the clinician should assume ongoing hemorrhage. In such patients volume replacement should be with blood products and fibrinogen as necessary, rather than crystalloid
- There are no universally accepted guidelines for replacement of blood components in patients with PPH
- before laboratory studies are available, we suggest transfusing 2 units of packed red blood cells (pRBCs) if hemodynamics do not improve after the administration of 2 to 3 liters of normal saline

- 4 units pRBCs followed by 4 units FFP if no laboratory results are available, bleeding is ongoing, and bleeding is due to atony; the 1:1 pRBC:FFP ratio is maintained until tests of hemostasis are available

- FFP is begun sooner in patients with abruption, amniotic fluid embolism, or prolonged hemorrhage as impaired hemostasis is more likely in these settings

There is no consensus on the optimal ratio of blood product replacement;

- When no massive transfusion

A pragmatic approach is 1 unit FFP for every 2 to 3 units of RBCs or 4 units FFP for every 6 units of RBCs

- When a massive transfusion is needed,:

the recommended initial transfusion ratio for RBCs:FFP:platelets is typically 1:1:1 to mimic replacement of whole blood

- For patients with unstable vital signs, suspicion of disseminated intravascular coagulation, or blood loss >1500 mL, transfuse pRBCs, FFP, and platelets in a ratio of 6:4:1 or 4:4:1. If coagulopathy persists after 8 to 10 units pRBCs and coagulation factor replacement, recombinant activated factor VIIa is a reasonable option

Monitoring

- Blood loss should be estimated every 15 to 30 minutes and laboratory studies drawn every 30 to 60 minutes to guide blood product replacement.
- In any massive transfusion situation where multiple units of blood are rapidly transfused, calcium and potassium should be monitored

Transfusion targets

- Hemoglobin greater than 7.5 g/dL
- Platelet count greater than 50,000/mm3
- Fibrinogen greater than 300 mg/dL
- Prothrombin time less than 1.5 times the control value

- A fibrinogen level >200 mg/dL in a pregnant woman is considered the minimum level necessary for adequate coagulation. As discussed in the section on coagulation studies above, this author recommends that attempts be made to elevate the fibrinogen level to >300 mg/dL in those situations where there is active bleeding and resuscitation is being carried out.
- It is important to stress that critically low fibrinogen levels cannot be returned to normal using only FFP without the use of cryoprecipitate; in some cases of established coagulopathy, fibrinogen concentrate is also essential
- prothrombin complex concentrates (PCC) are available and have been suggested as an alternative to FFP

- Pregnant women with COVID-19 diagnosis do not have increased risk for obstetric hemorrhage, increased QBL or risk of maternal morbidity compared with pregnant women without a COVID-19 diagnosis.
- In pregnancy, low fibrinogen was the only coagulation parameter associated with PPH severity; with a positive predictive value of 100% with fibrinogen.
- we highlight a possible link between third-trimester maternal COVID19 infection and rapid maternal deterioration, with progressive coagulopathy, improving shortly after delivery. To date, no maternal mortality in COVID19 has been reported.

- consideration of prophylactic LMWH may be valuable in the immediate postpartum periodwith covid 19.

The end