

Postpartum Hemorrhage

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Medical management

INTRODUCTION

There is many potentially effective interventions for management

The key to management :

- 1) recognize excessive bleeding before it becomes life threatening
- 2) identify the cause
- 3) initiate appropriate intervention based on the clinical setting (eg, cause and severity of bleeding, whether the abdomen is open or not).

protocols, and guidelines

teams

obstetri
cian

nurses

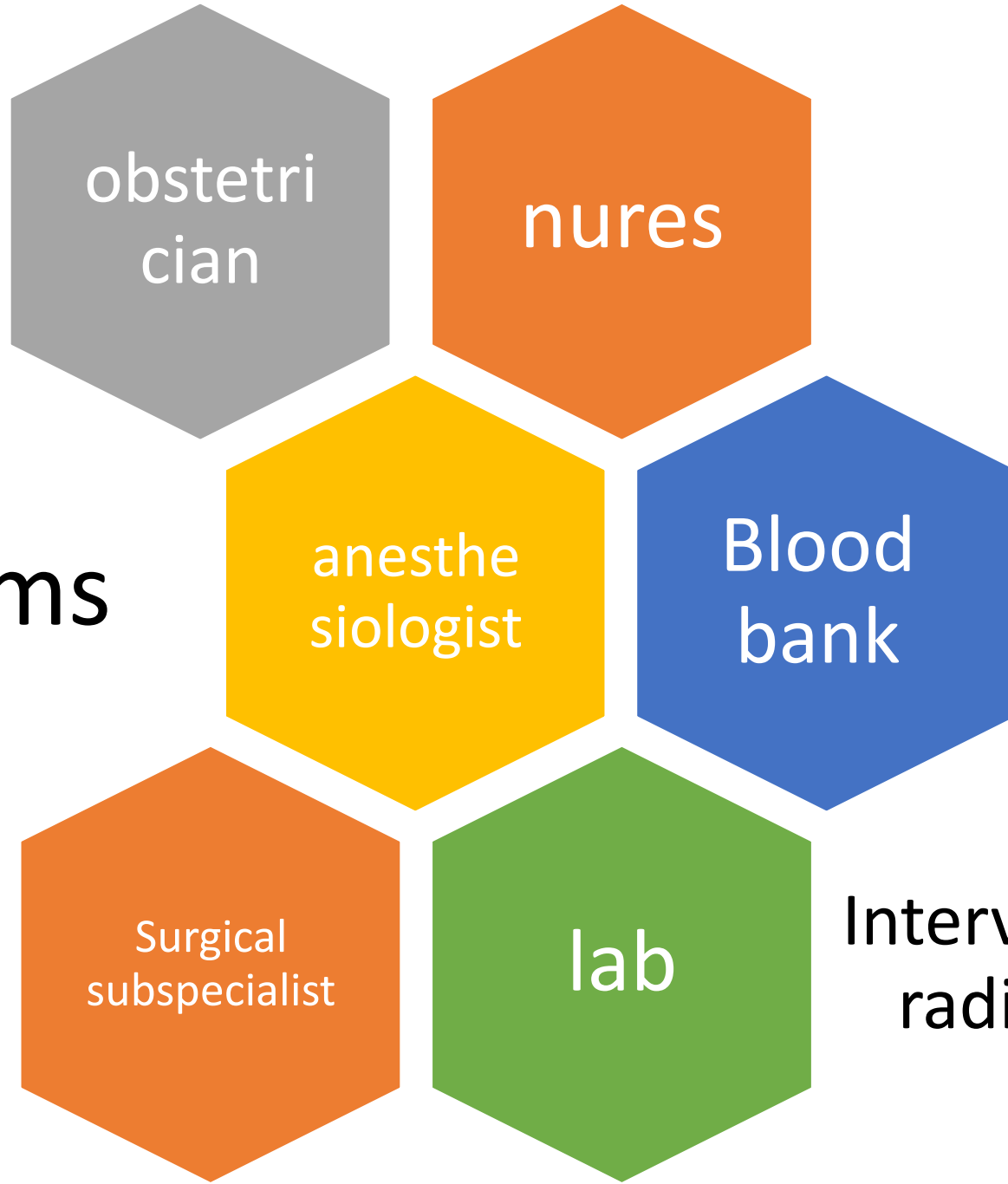
anesthe
siologist

Blood
bank

Surgical
subspecialist

lab

Interventional
radiologist



INITIAL PATIENT ASSESSMENT

Postvaginal delivery

Patients with persistent excessive vaginal bleeding after vaginal •
delivery should be assessed **immediately** by a provider **who can**
initiate **all necessary emergency care**.

Assessment includes



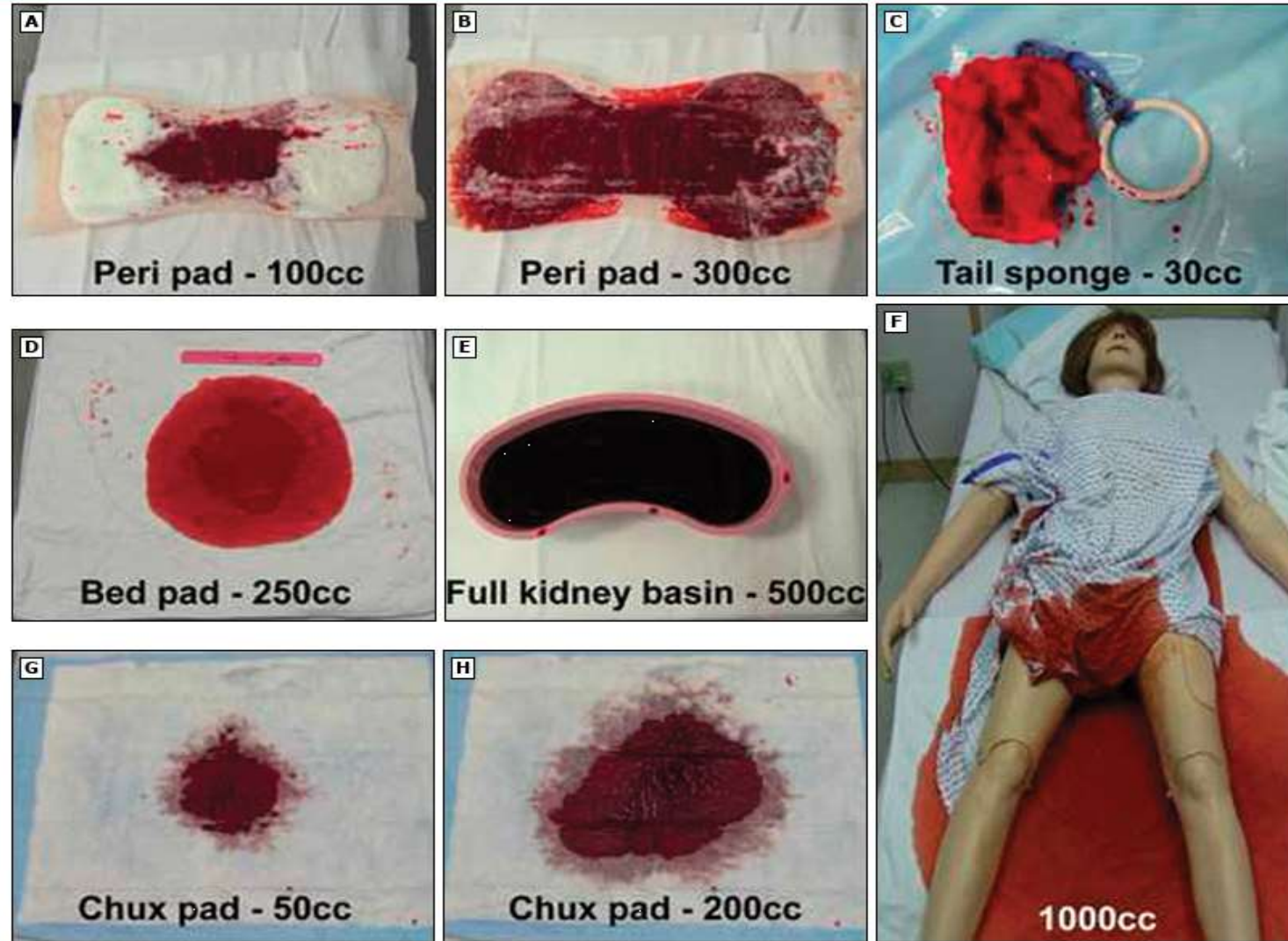
Vital signs:BP,PR,T,RR,UOP,O2 sat.,

Estimated blood loss: Quantify by weighting bloody materials & volumetric containers

Clot observation test (clotting time)

Review drugs the patient has received

Visual aid for estimating intrapartum blood loss



Visual aid. Pocket card with images of measured volumes of artificial blood.

From: Zuckerwise LC, Pettker CM, Illuzzi J, et al. Use of a novel visual aid to improve estimation of obstetric blood loss. *Obstet Gynecol* 2014; 123:982. DOI: [10.1097/AOG.0000000000000233](https://doi.org/10.1097/AOG.0000000000000233). Reproduced with permission from Lippincott Williams & Wilkins. Copyright © 2014 American College of Obstetricians and Gynecologists. Unauthorized reproduction of this material is prohibited.

Basic interventions

Continue to monitor vital signs and quantify blood loss.

move potentially unstable patients to an operating room

Establish
adequate
intravenous
access

large bore catheter
(14 or 16 gauge)

Resuscitate with crystalloid

(target systolic BP: 90 mmHg & uop at >30 mL/hour)

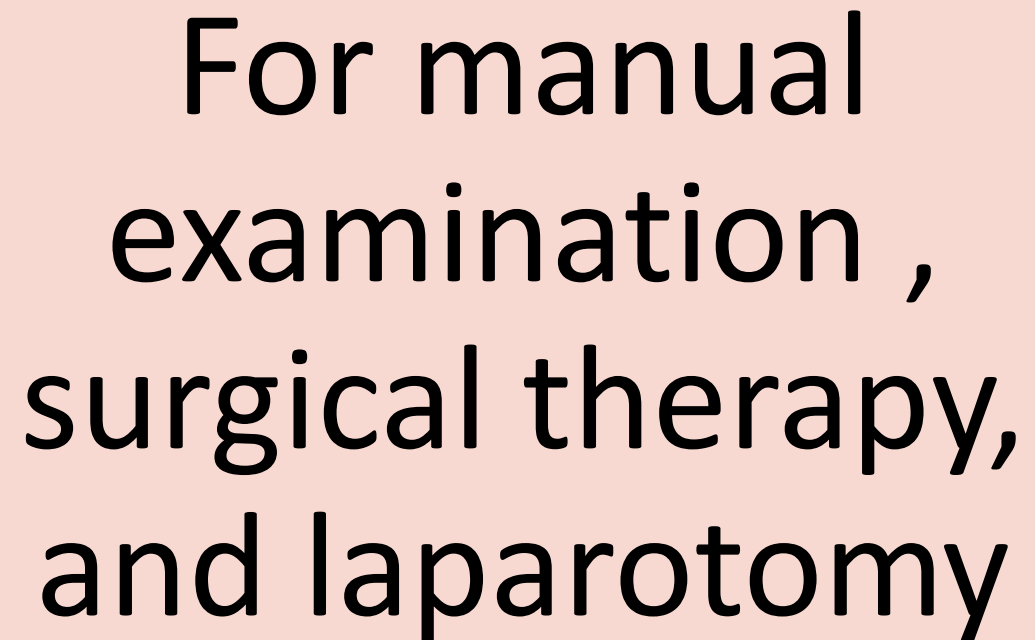
Rapid infusion >3 to 4 L, may promote:
dilutional coagulopathy, electrolyte imbalances, and hypothermia

so :

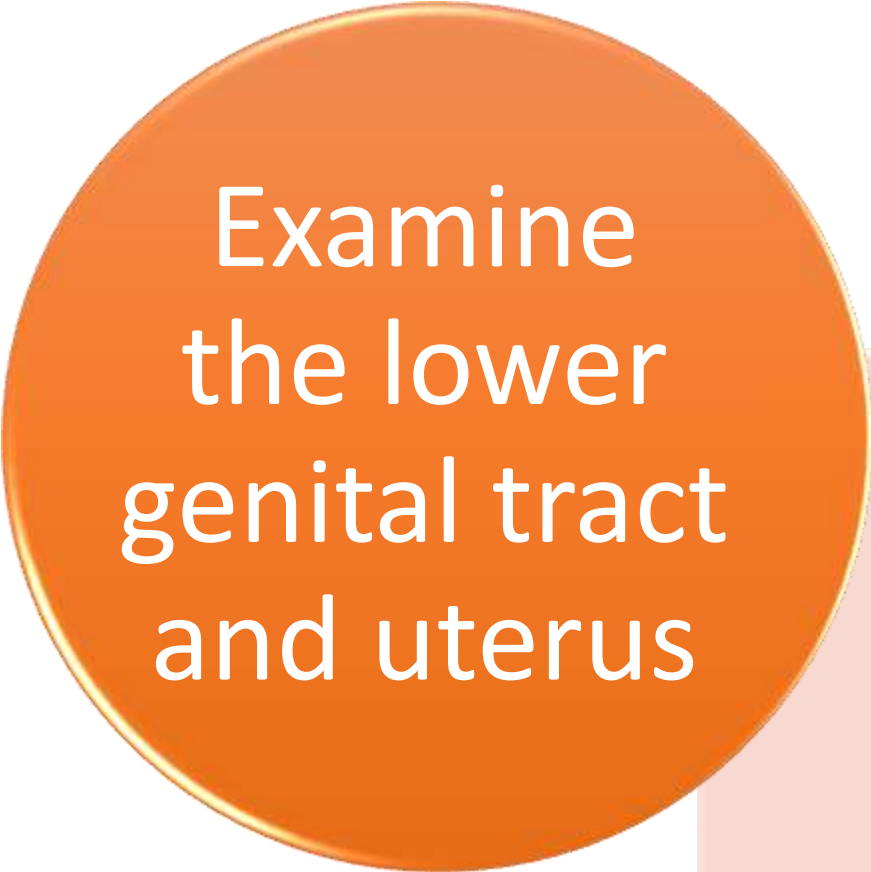
monitoring of hematocrit, coagulation status, core temperature, and electrolytes is essential

An orange circle with a thin gold border, containing the text 'adequate anesthesia' in white.

adequate
anesthesia

A light pink rectangular box containing the text 'For manual examination , surgical therapy, and laparotomy' in black.

For manual
examination ,
surgical therapy,
and laparotomy


An orange circle with a thin white border, containing the text 'Examine the lower genital tract and uterus' in white. It is positioned on the left side of the slide, partially overlapping a light orange rectangular background on the right.

Examine the lower genital tract and uterus

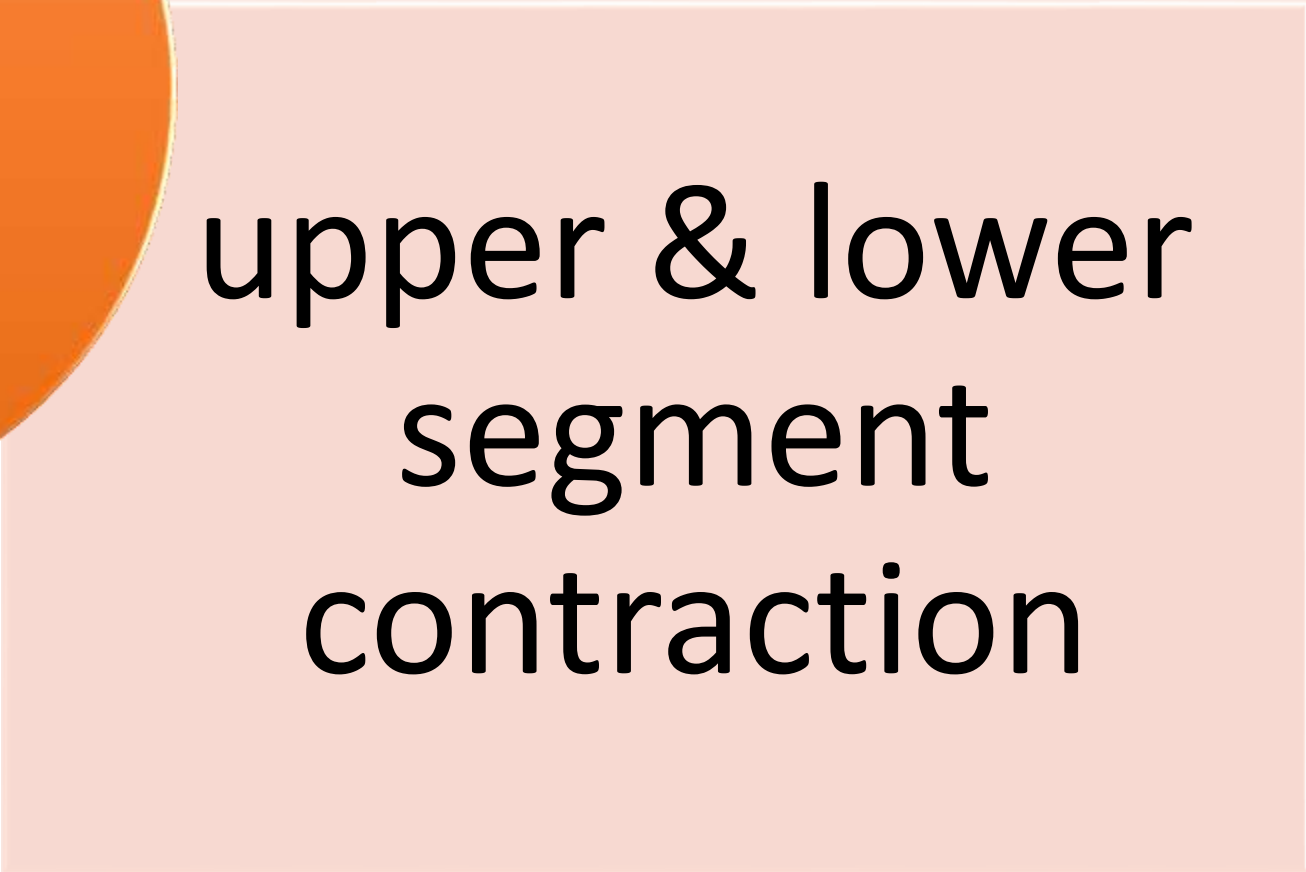
vaginal, abdominal, and rectal examination:

adequate assistance, exposure, lighting, instruments, and anesthesia.


in **all** patients with PPH after **NVD**, or significant cervical dilatation and descent before a **C/D**

An orange circle with a thin gold border, containing the text 'Assess uterine tone' in white.

Assess
uterine
tone

A light pink rectangle with a thin gold border, containing the text 'upper & lower segment contraction' in black.

upper & lower
segment
contraction

An orange circle with a thin gold border, containing the text 'Examine the uterine cavity' in white.

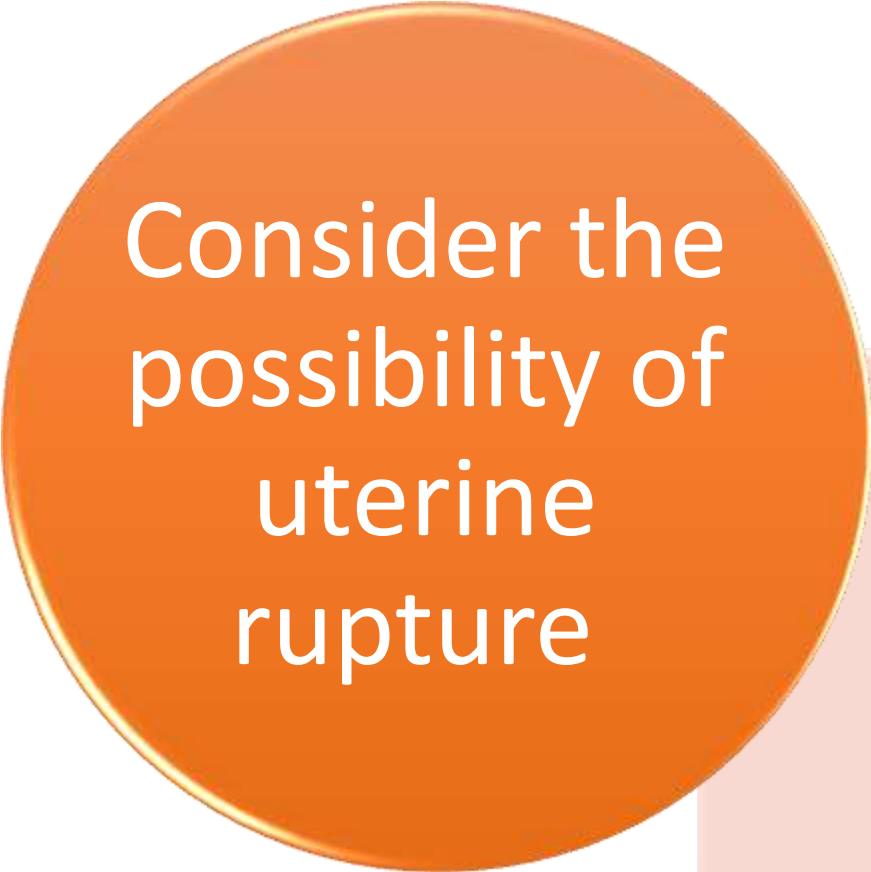
Examine the uterine cavity

retained products of
conception;

more common after vaginal
than cesarean delivery,
unless the cesarean was
performed for a morbidly
adherent placenta

Assess for uterine inversion

a smooth round mass protruding from the cervix or vagina on vaginal examination and/or lack of a normally positioned fundus on abdominal examination

An orange circle with a thin gold border, containing the text 'Consider the possibility of uterine rupture' in white.

Consider the possibility of uterine rupture

VBAC or induction or instrumental delivery or dystotia.

pain & persistent V/ B despite use of uterotonines.

Even mild hemodynamic instability in any postpartum patient, whether she has observed bleeding or not, should prompt consideration of uterine rupture and intra-abdominal bleeding.

Hematuria may occur if the rupture extends into the bladder

Begin treatment of the cause of bleeding



Manage atony

Repair bleeding lacerations

Remove any retained tissue

Manually replace an inverted uterus

uterine rupture : definitive surgical management is hysterectomy. Uterine repair may be possible: patient plans for future pregnancies, extent of uterine damage, hemodynamic stability, and the surgeon's skills

Repair vaginal and cervical lacerations



assistants

Exposure

anesthesia

avoid of pitfalls : 1) Sutures should not be placed cephalad to the fornix, 2) Vaginal hematomas should not be drained unless expanding. 3) Arterial or heavy active vaginal bleeding should not be treated with packing,

Retained tissue

Remove manually or by ring forceps

Banjo curren

16 mm suction catheter

Manage atony

uterine atony is the most common cause of PPH

uterotonic drugs are administered for presumed atony until a therapeutic effect is observed or until it is obvious that these drugs are ineffective.

The important point is *not the sequence of drugs*, but *the prompt initiation of uterotonic* therapy and the prompt assessment of its effect.

It should be possible to determine **within 30 minutes** whether pharmacologic treatment is reversing uterine atony.

If it does not, **prompt invasive intervention** is usually warranted

Atony

Fundal
massage

Bimanual

-
-

uterotonines

Oxytocine, methylergonovine •
Carboprost, misoprostol •

Oxytocine



A vertical diagram showing three administration routes for oxytocin. Each route is represented by a colored horizontal bar with a white circle on the left. The circles are connected by a vertical line. The top circle is yellow, the middle is green, and the bottom is blue. Each circle has a small blue line extending from its top-left and bottom-left.

40 units in 1 L of normal saline iv up to 80 units in 500 mL over 30 minutes

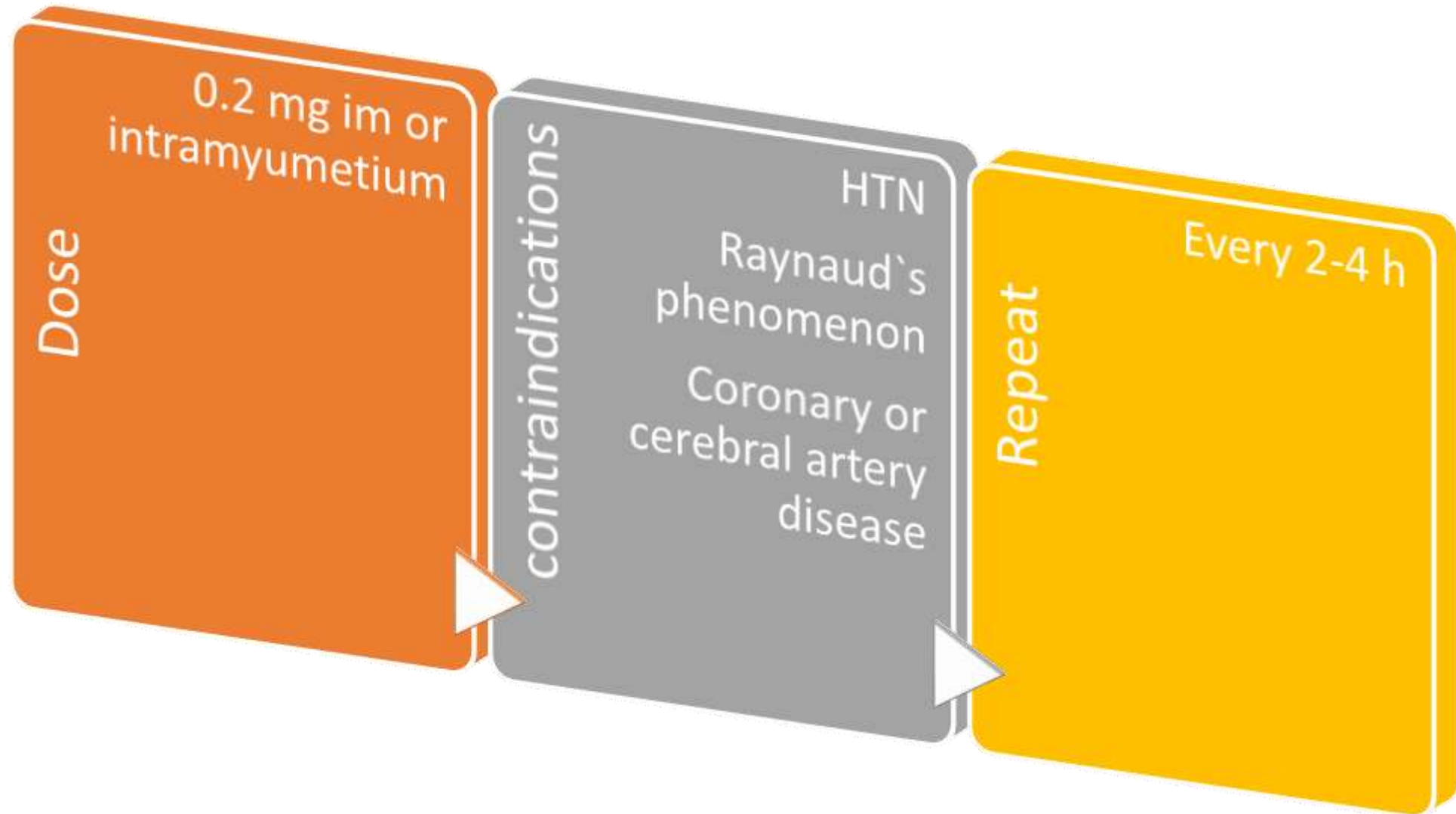
10 units intramuscularly

15 units in 250 mL (limitation of fluid)

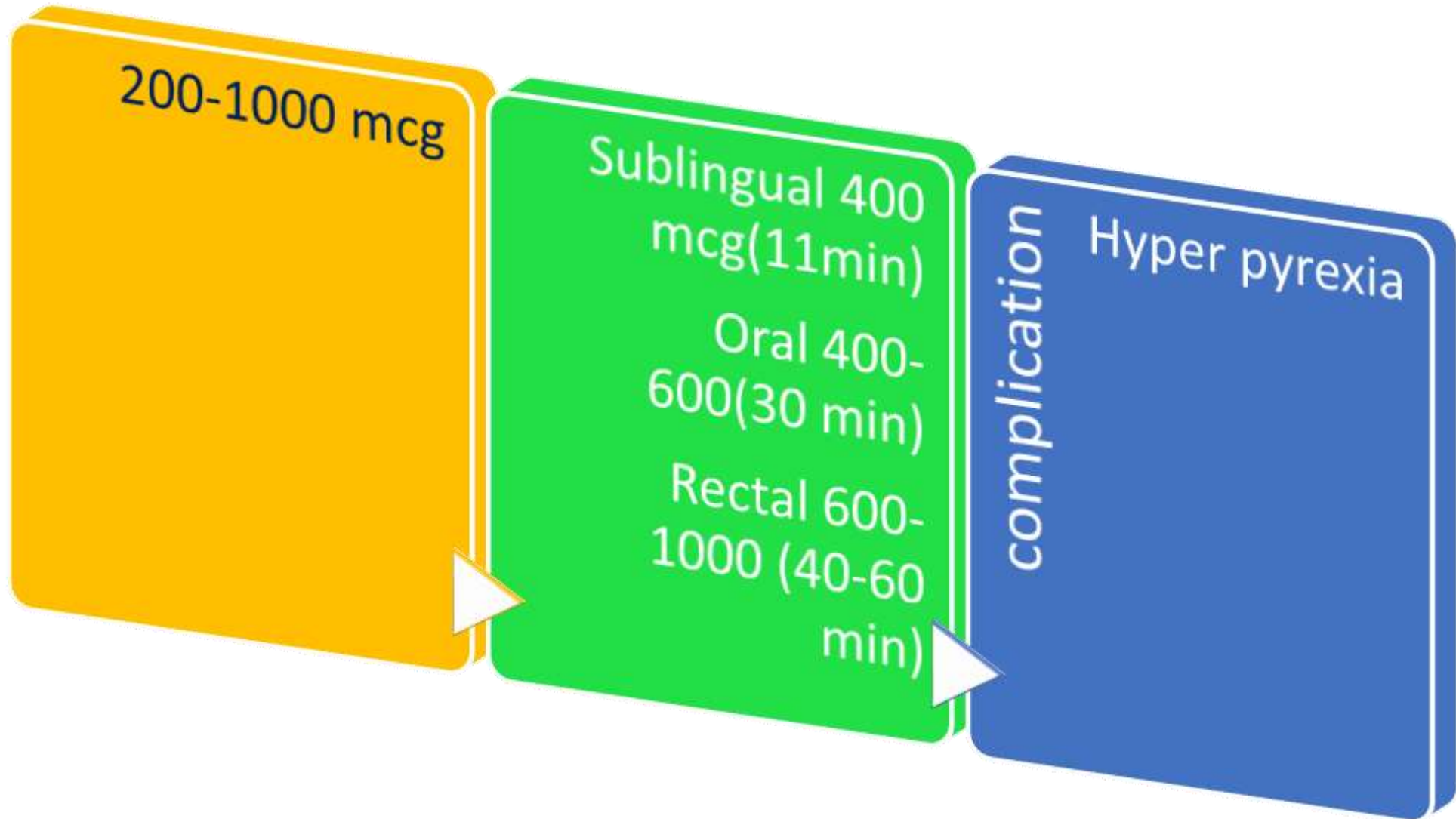
Carboprost tromethamine



Methylergonovin



Misoprostol



If these pharmacologic interventions are ineffective or only partially effective,

or if there is any delay in getting these uterotonic drugs

Then: tamponade balloon to decrease bleeding and plan for interventional radiology or surgical options.

Uterotonic drugs are continued until bleeding is controlled.

Other uterotonines

Dinoprostol

- 20 mg vaginal or rectal suppository repeated at two-hour intervals

Carbetocin

- a long-acting analog of [oxytocin](#)
100 mcg is given by a single slow iv

Tranexamic acid

1 g by intravenous injection (infusion in 100 cc saline in 10-20 min.)

Reduces:

death due to bleeding by 19 percent .

incidence of laparotomy to control bleeding by 36 percent

Did not reduce:

hysterectomy

all-cause mortality, which included death from sepsis, organ failure, eclampsia, pulmonary emboli, etc;

risk of thromboembolic events

should not be mixed with blood or penicillin.

should not be given to patients with subarachnoid hemorrhage or active intravascular clotting (disseminated intravascular coagulation).

The dose should be reduced in patients with renal insufficiency, venous or arterial thrombosis, or ureteral bleeding

Transfusion

no universally guidelines

2 units pRBCs if hemodynamics do not improve after 2 to 3 liters of normal saline, estimated blood loss is under 1500 mLs, and continued bleeding is likely

no consensus on the optimal ratio of blood product replacement; recommendations for RBC:fresh frozen plasma (FFP): platelet ratios vary widely

pRBC, FFP, and platelets in a ratio of 6:4:1 or 4:4:1. and 1 pool (6bags) cryoprecipitate

fibrinogen concentrate (RiaSTAP) when fibrinogen <100 mg/dL and FFP and cryoprecipita are not available

recombinant activated factor VIIa if coagulopathy persists after 8-10 U pRBC & coagulation factor replacement

Targets

Hemoglobin greater than 7.5 g/dL •

Platelet count greater than 50,000/uL •

Fibrinogen greater than 100 mg/dL •

Prothrombin (PT) and partial thromboplastin time (PTT) less than 1.5 times control •

4 units of FFP are given if the INR is more than 1.5 •
one apheresis platelet pack is given if the platelet count is less than 50,000/microL
and 10 bags of cryoprecipitate are given if the fibrinogen is less than 100 mg/dL

Monitoring



Blood loss estimation(every 15 to 30 min)

Lab. studies every 30 to 60 min.(PT, aPTT, and plt)

Ionized calcium(every 15 to 30 min& then hourly)

Potassium

Ionized calcium :as baseline & every 15 to 30 min. during a massive transfusion, & then hourly for the next few hours after transfusions have been completed

<1 mmol/L (normal 1.1 to 1.3 mmol/L):

infusing 1 gram of calcium chloride over two to five minutes via a central line.

Or 1 to 2 grams of calcium gluconate can be infused intravenously over two to three min. for every four units of pRBCs transfused .

Hypocalcaemia has a linear, concentration-dependent relationship more important in predicting hospital mortality than the lowest fibrinogen concentration, the development of acidosis, or the lowest platelet count .

Potassium – Hyperkalemia may result from the rapid transfusion of multiple units of pRBCs, especially if they are older units.

1 percent dextrose water infusion of 500 mL/hour should be given along with intravenous regular insulin (10 units). Repeat bolus doses of regular insulin 10 units may be required.

Recombinant activated factor VII

intractable bleeding

40 mcg/kg repeat every 2 hr

Plt>50000, fibrinogen>50-100 nl PH&temp.& ca

Prothrombin complex concentrate (pcc)



Three-factor (II, IX, X) and four-factor (II, VII, IX, X)

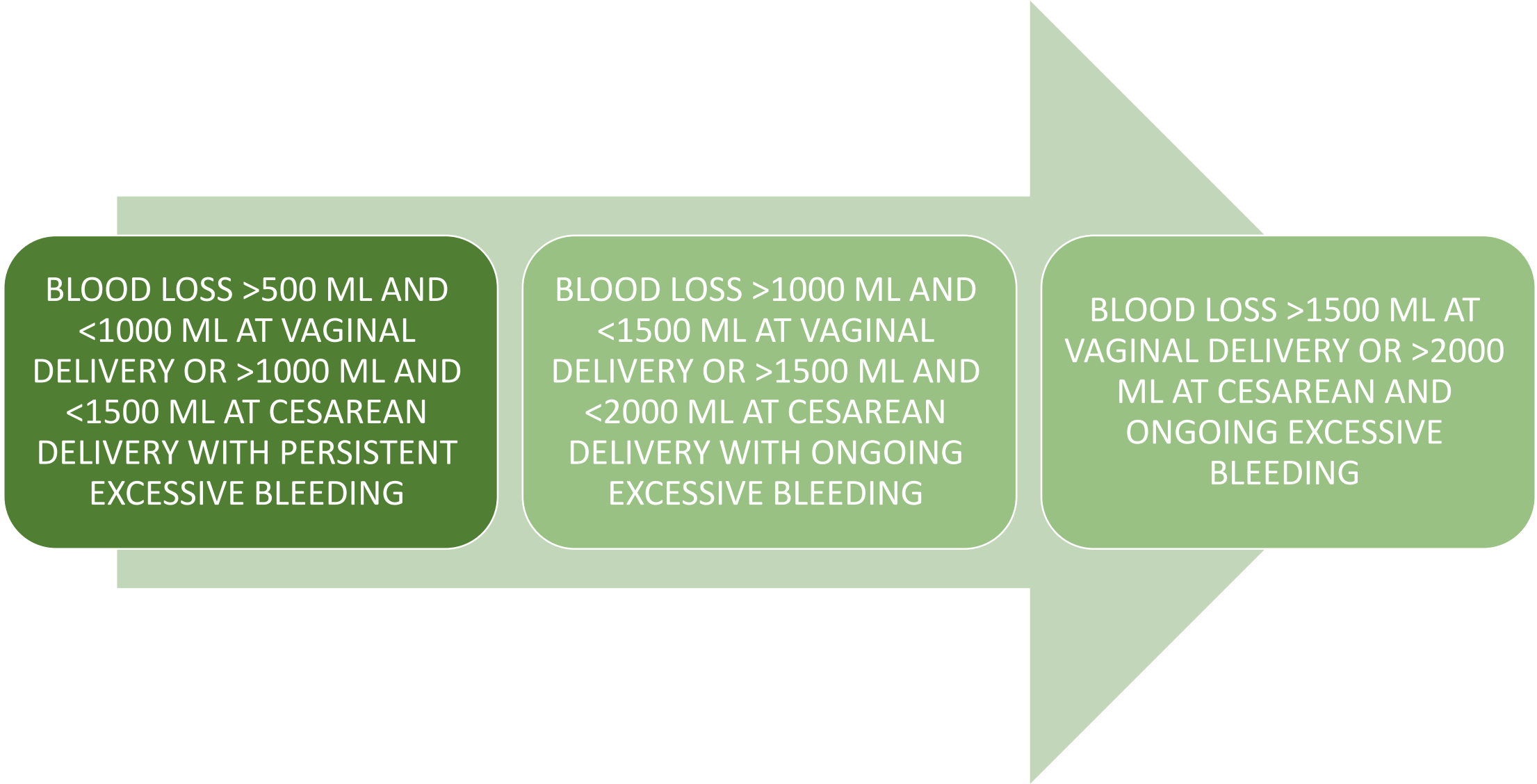
alternative to FFP

advantages: reduced risk of volume overload & TRALI & allergic reactions, no need for thawing or blood group typing,

Disadvantages: very high cost and increased risk of thrombosis.

uterine or hypogastric artery embolization

- By an interventional radiologist
- persistent excessive bleeding
- is hemodynamically and hemostatically stable
- where personnel and facilities are readily available



BLOOD LOSS >500 ML AND
<1000 ML AT VAGINAL
DELIVERY OR >1000 ML AND
<1500 ML AT CESAREAN
DELIVERY WITH PERSISTENT
EXCESSIVE BLEEDING

BLOOD LOSS >1000 ML AND
<1500 ML AT VAGINAL
DELIVERY OR >1500 ML AND
<2000 ML AT CESAREAN
DELIVERY WITH ONGOING
EXCESSIVE BLEEDING

BLOOD LOSS >1500 ML AT
VAGINAL DELIVERY OR >2000
ML AT CESAREAN AND
ONGOING EXCESSIVE
BLEEDING

Blood loss:

>1000 ml & <1500 ml in V/D

Or

>1500 ml & <2000 ml in C/D

With ongoing excessive bleeding

These patients are generally hemodynamically stable, but may have •
mild tachycardia and/or hypotension before initiation of therapy.

Blood loss:

>500 ml & <1000 ml in V/D

Or

>1000 ml & <1500 ml in C/D

With persistent excessive bleeding

These patients may have hemodynamic instability •

Basic interventions



Do all of the above

move patient to an operating room

Central venous access via the subclavian or internal jugular

bladder catheter

Laboratory evaluation

Complete blood count,
including platelet count –
For 500 mL of blood loss,
Hb. falls by one gram/dL

Type and crossmatch

Coagulation studies
Fibrinogen , PT, aPTT.
(repeated every 30 to 60
minutes)

TEG and ROTEM —
Thromboelastography (eg,
TEG) and rotational
thromboelastometry (eg,
ROTEM)???in pregnancy???

Uterine tamponade

Atony or lower segment bleeding

Monitoring of Hb,UOP,volume of bleeding

Remove after 24 hr

Blood loss:

>1500 ml in V/D

Or

>2000 ml in C/D

With ongoing excessive bleeding

Basic interventions



Do all of the above, if possible

Maintain oxygenation — Maintain oxygen saturation >95 percent by administering oxygen (10 to 15 L/minute) by face mas

Avoid hypothermia and acidosis

Consider laparotomy