

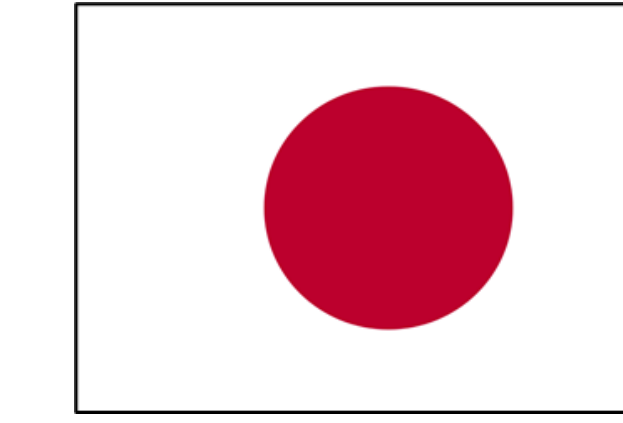
A case of acute kidney injury following resuscitative endovascular balloon occlusion of the aorta (REBOA) for management of postpartum hemorrhage due to partial placenta previa

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Background:

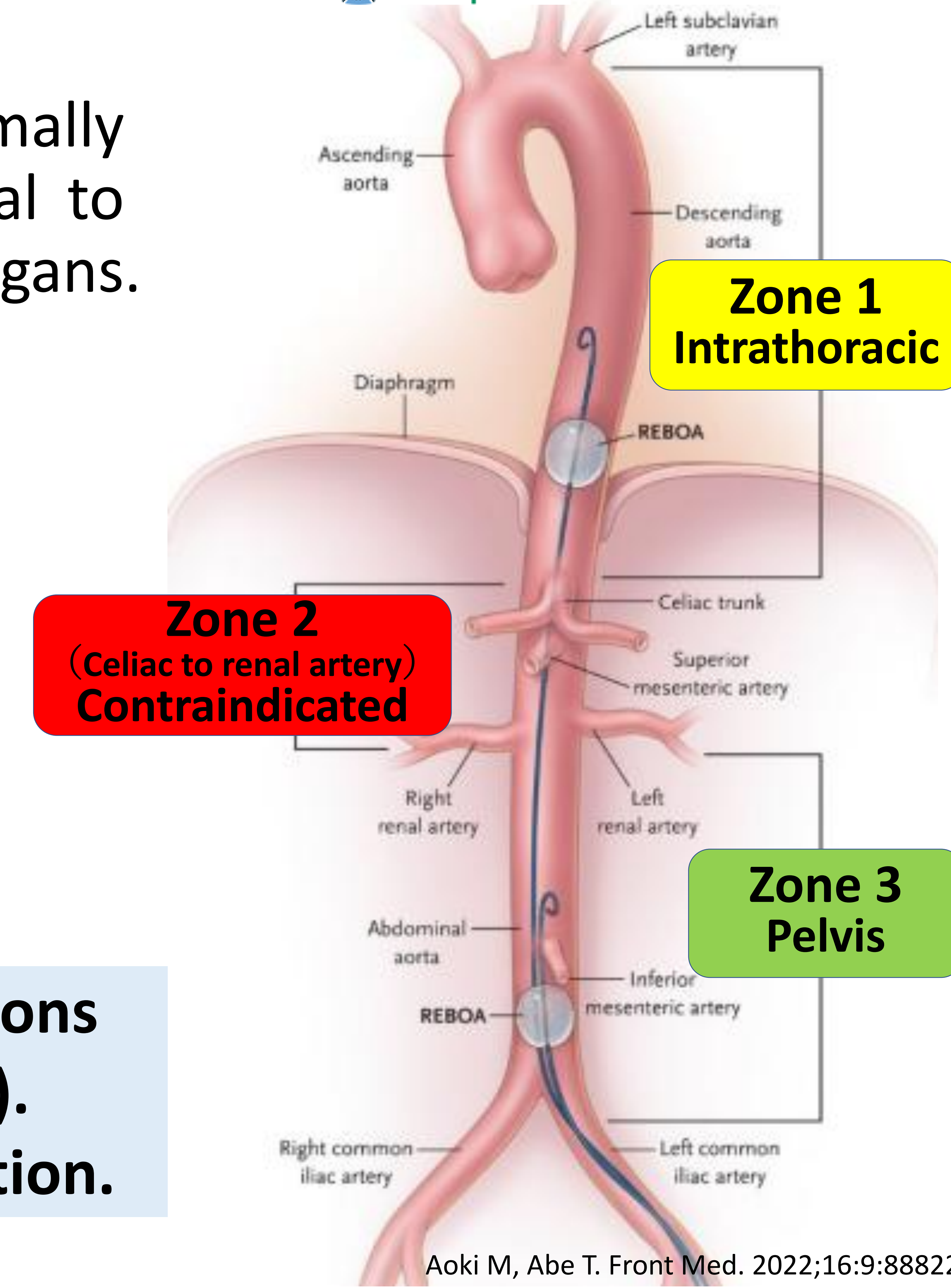
- **Resuscitative endovascular balloon occlusion of the aorta (REBOA)** is a minimally invasive technique to control life-threatening non-compressible bleeding distal to the occlusion site (Zone 1 or 3) while maintaining blood flow to proximal vital organs.

Recommendations for REBOA (by the Japan Society of Obstetrics and Gynecology):

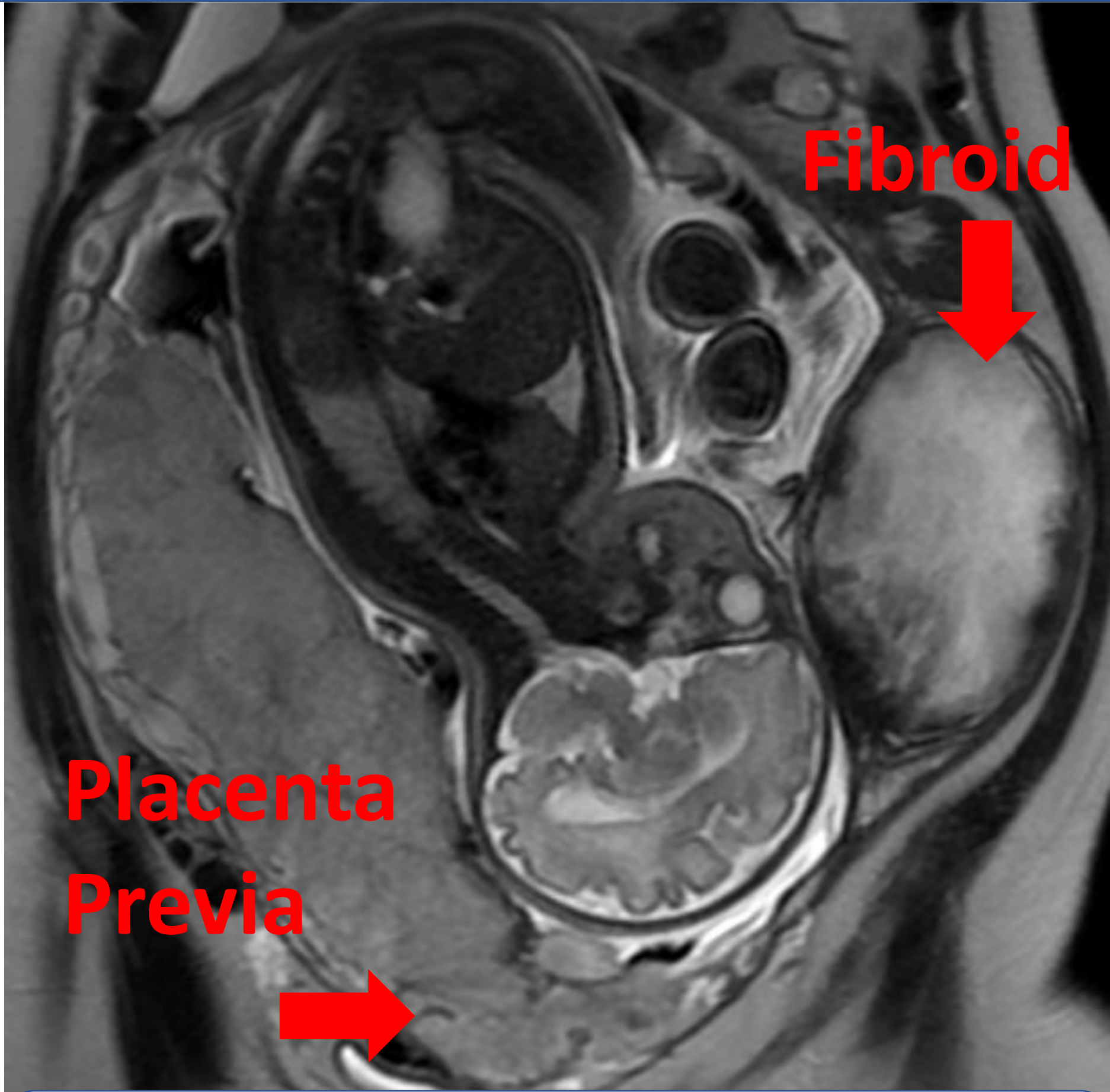
- **Severe postpartum hemorrhage (PPH)**
e.g. uterine atony, uterine rupture
- **Bridge to definitive hemostasis**
Surgery and/or embolization by interventional radiology (IVR)
- **Prophylactic use in high-risk deliveries**
When massive bleeding is anticipated during cesarean section,
e.g. placenta previa with placenta accreta spectrum (PAS)

REBOA can reduce blood loss, decrease blood transfusion requirements, and improve uterine preservation rates.

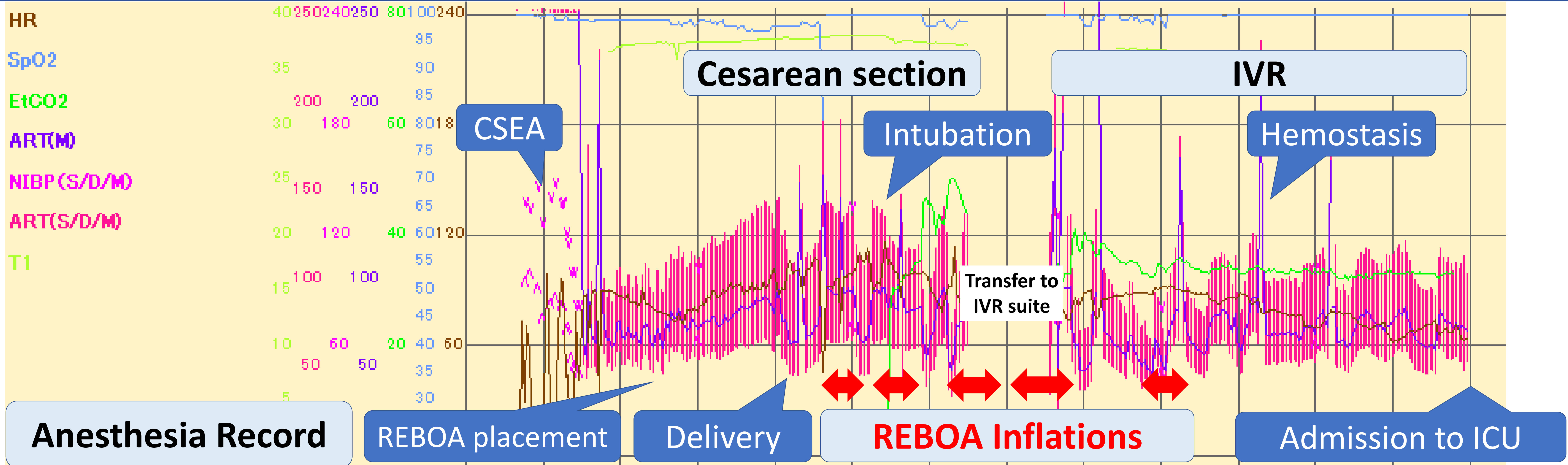
REBOA itself may cause complications such as acute kidney injury (AKI). Indications remain under investigation.



The Case: 34-year-old primigravid woman (161cm 73.7kg)
Partial placenta previa with possible placenta accreta spectrum (PAS)



Preoperative MRI



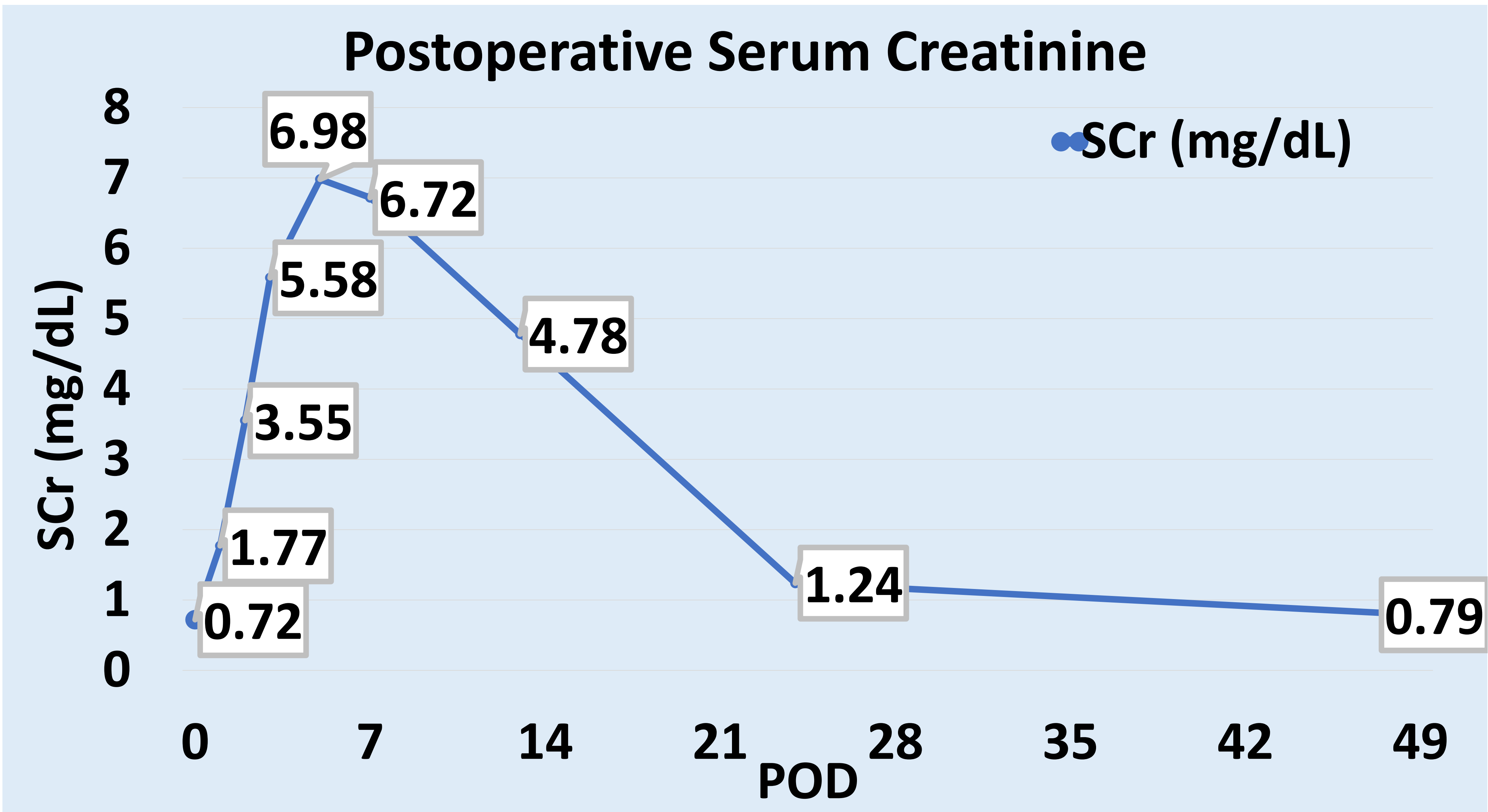
Plan for management : REBOA placement prior to cesarean section by CSEA. Conversion to GETA following delivery for subsequent hemorrhage control and transfer to IVR suite. Postoperative management in the ICU.

Blood loss : 4470 ml, with an estimated additional 2000 ml during IVR.

Blood transfusion : RBC 1680ml, FFP 960ml, Plt 400ml, Fibrinogen 3g

Fetal outcome : Healthy infant, Apgar 8/9, pH 7.33

Maternal outcome : Extubation on POD2. Elevated serum creatinine diagnosed as acute kidney injury (AKI), likely associated with REBOA. Left the ICU on POD5, discharged to home on POD15, return to normal kidney function at nephrology follow-up on POD49.

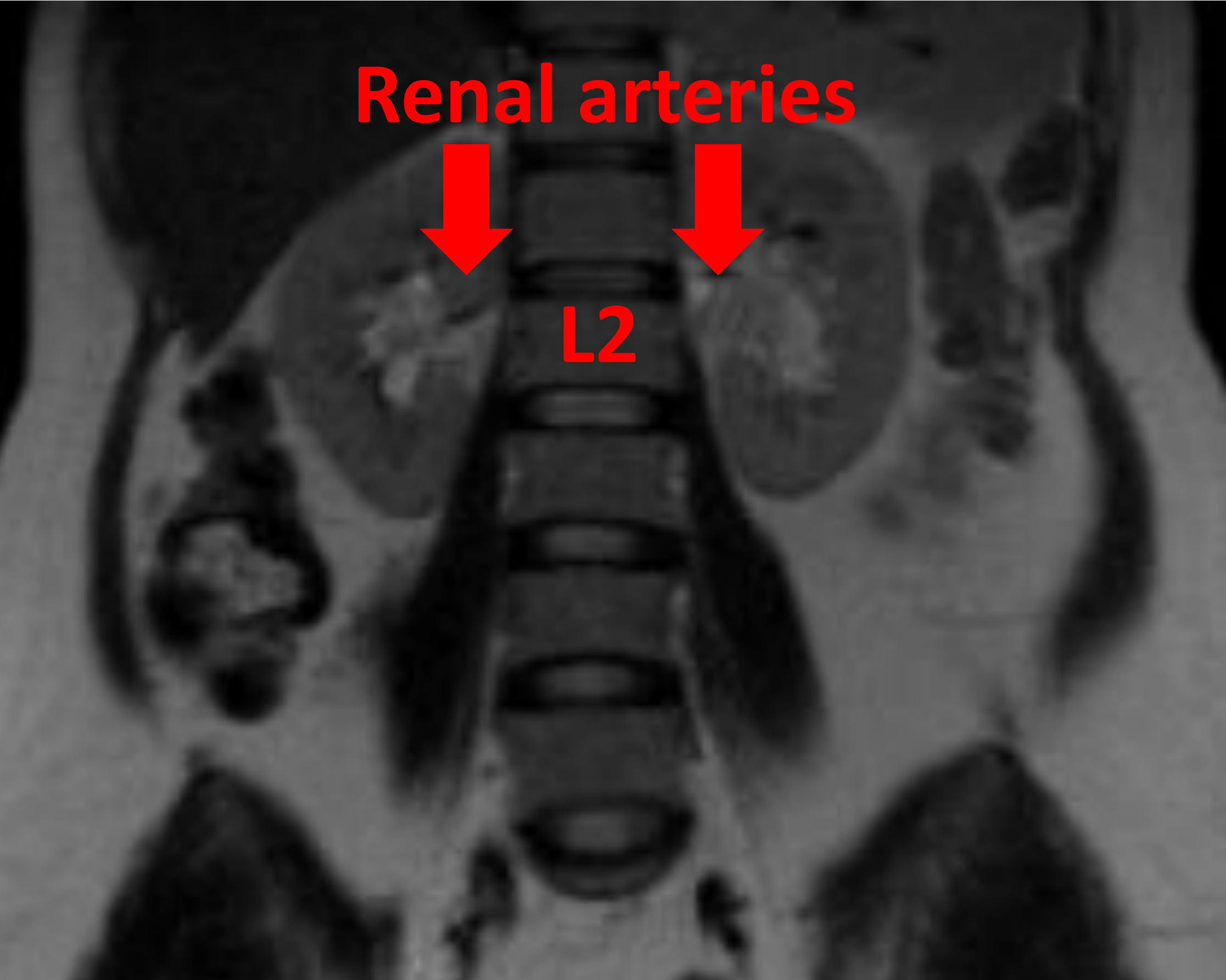


Teaching Points

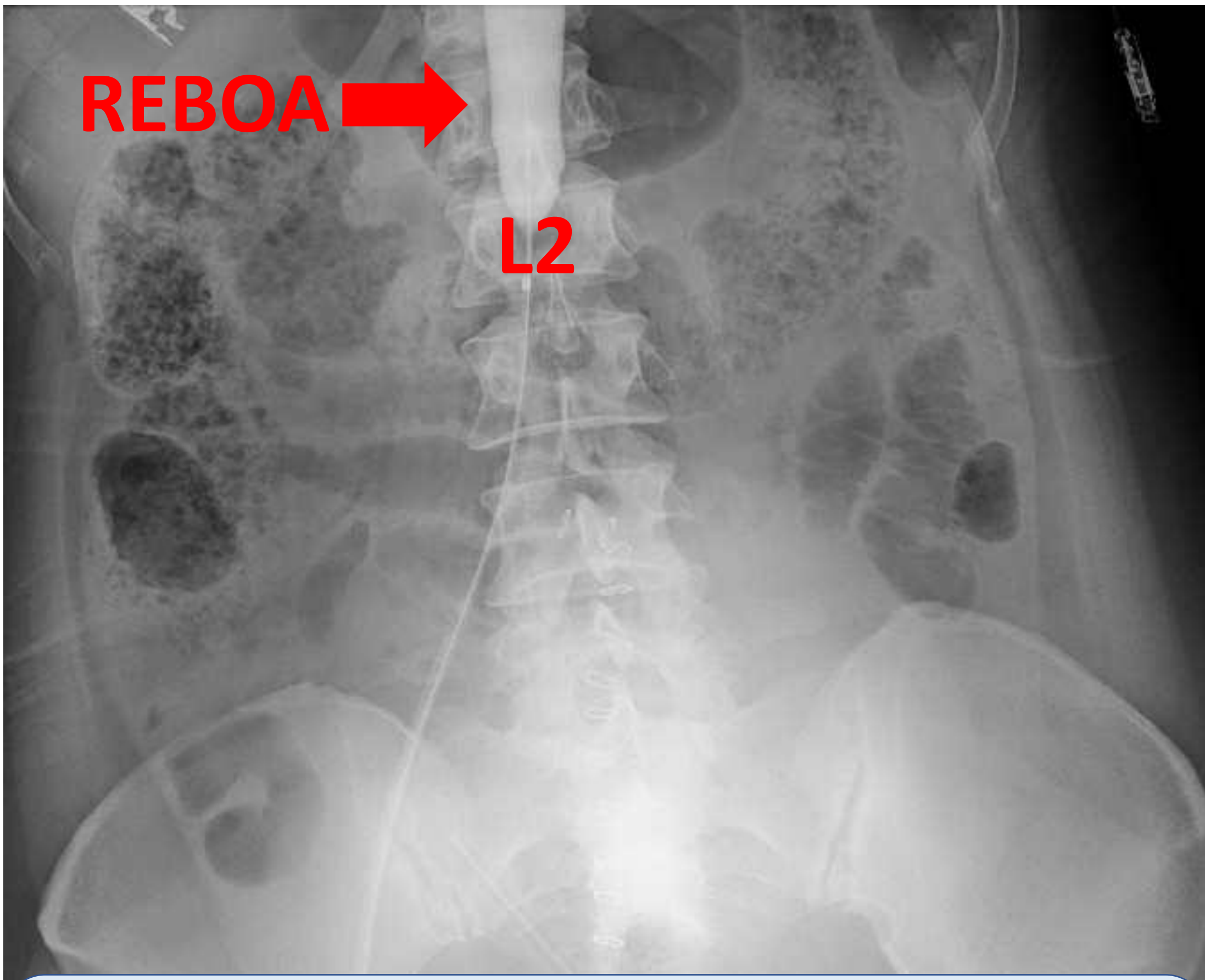
Complications of REBOA

Complication	Zone 1	Zone 3
Acute Kidney Injury (AKI)	5.6 – 46%	Mild
DVT	11 – 14%	
Lower Limb Ischemia	4 – 15%	3 – 8%
Compartment Syndrome	4 – 15%	4 – 15%
ARDS	7.1 – 17.5%	Mild
Intestinal Ischemia	Often	
Reperfusion Injury	Severe	Mild

Fontenelle Ribeiro Junior MA, Salman SM, Al-Qaraghuli SM, et al. Trauma Surg Acute Care Open. 2024;9(1):e001267.



Preoperative MRI
Renal arteries at L2 level



Postoperative X-ray
Possible infringement on Zone 2

Mechanism of AKI associated with REBOA :

1. Renal injury due to ischemia (interruption of blood flow)

Influenced by the location of the occlusion (Zone 1 or Zone 3), level of occlusion (partial or complete), and the duration of occlusion.

2. Reperfusion injury

Reactive oxygen species, inflammatory cytokines, and metabolic acidosis can cause damage to the kidneys.

3. Ischemia of distal muscle tissue

Lower limb ischemia → Myoglobinemia → Renal tubular injury

To prevent AKI :

1. Confirm proper balloon position (in Zone 3)
2. Minimize occlusion time (<60min for Zone 3)
3. Utilize partial occlusion (pREBOA)
4. Continue volume resuscitation (temporarily elevated afterload masks hypovolemia)
5. Monitor lower limb ischemia (e.g. NIRS)

Careful patient selection and complication prevention are essential.