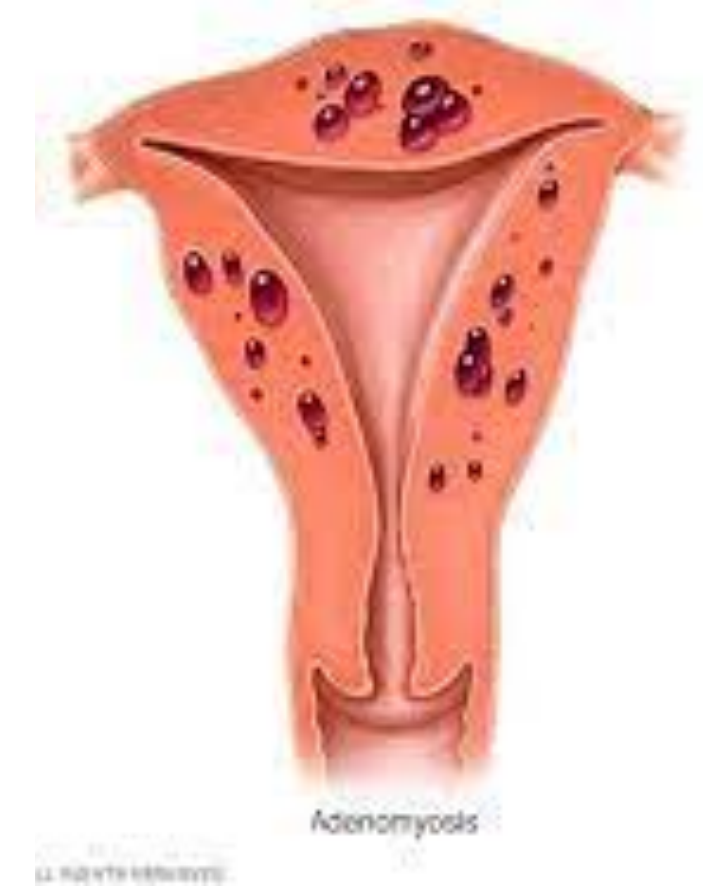




CASE DISCUSSION

Case

- **Case** : A Thai female 33 years old
- **Diagnosis** : Adenomyosis with multiple leiomyoma with heavy menstrual bleeding
- **Operation** : Total laparoscopic hysterectomy with bilateral salpingectomy



Patient's history

■ **Chief complaint** : ประจำเดือนออกมากขึ้น 2 mo PTA

■ **Present illness** :

2 ปี PTA ปวดท้องเวลามีรอบเดือนและมีเลือดประจำเดือนออกมากขึ้น->

Dx multiple myoma with pressure symptom เข้ารับการผ่าตัด Myomectomy พบ pelvic endometriosis

2 เดือน PTA ยังมีเลือดออกทางช่องคลอด ใช้แพมเพิส 3 แผ่นชุ่ม มีอาการหน้ามืด

-> Admit ได้PRC 1 U แพทย์เจ้าของไข้ adviceเรื่องการผ่าตัด

วันนี้นัดมาผ่าตัด ยังมีเลือดออกทางช่องคลอดอยู่ ใช้ผ้าอนามัย 2 pads/day เกือบเต็มแผ่น ปวดท้องเล็กน้อย ไม่มีอาการหน้ามืด ไม่มีใจสั้น

Past history

- No underlying disease
- NPO time : AMN
- ปฏิเสธประวัติดื่มเหล้าหรือสูบบุหรี่
- ปฏิเสธประวัติแพ้ยาแพ้อาหาร
- 2ปีก่อน เคยผ่าตัด Myomectomy under GA -> no complication
- Functional class 1
- no current medication

Physical examination

- V/S : BT 36.6 °C BP 96/58 mmHg. HR 69 bpm RR 18/min
- BW 51.6 kg. Height 153 cm. BMI 22 kg/m²
- GA : good consciousness , not pale
- HEENT : not pale conjunctivae, anicteric sclerae

Airway examination

- Mouth opening > 3 cm
- No prominent incisor
- Upper lip bite test class 1
- Mallampati grade 1
- Thyromental distance > 6 cm

Physical examination

- Heart : pulse full and regular, no murmur
- Lungs : clear, equal breath sound
- Abdomen : soft, **midline palpable mass 18 wk size** , no guarding
- Extremities : no pitting edema
- Neuro : E4V5M6, pupil 2 mm RTLBE, no facial palsy, motor grade V all extremities

Investigation

- CBC : Hb 10.8 g/dl **Hct 33.4** % (baseline 33–34%) platelet 372,000 /mm³
- Electrolyte : Na 142 mEq/L K 3.72 mEq/L
Cl 107 mEq/L HCO₃ 24 mEq/L
- BUN 15.8 mg/dl Cr 0.64 mg/dl
- TVS : Uterus 11.6x7.1x9.7 cms , heterogenous hyperechoic in endometrium
(possible blood clot)

Problem list

1. Adenomyosis with multiple leiomyoma with heavy menstrual bleeding
2. Anemia

ASA classification

- ASA I

Preoperative evaluation

1. Patient factor

2. Surgical factor

3. Anesthetic factor

Patient factor

- **Anemia**

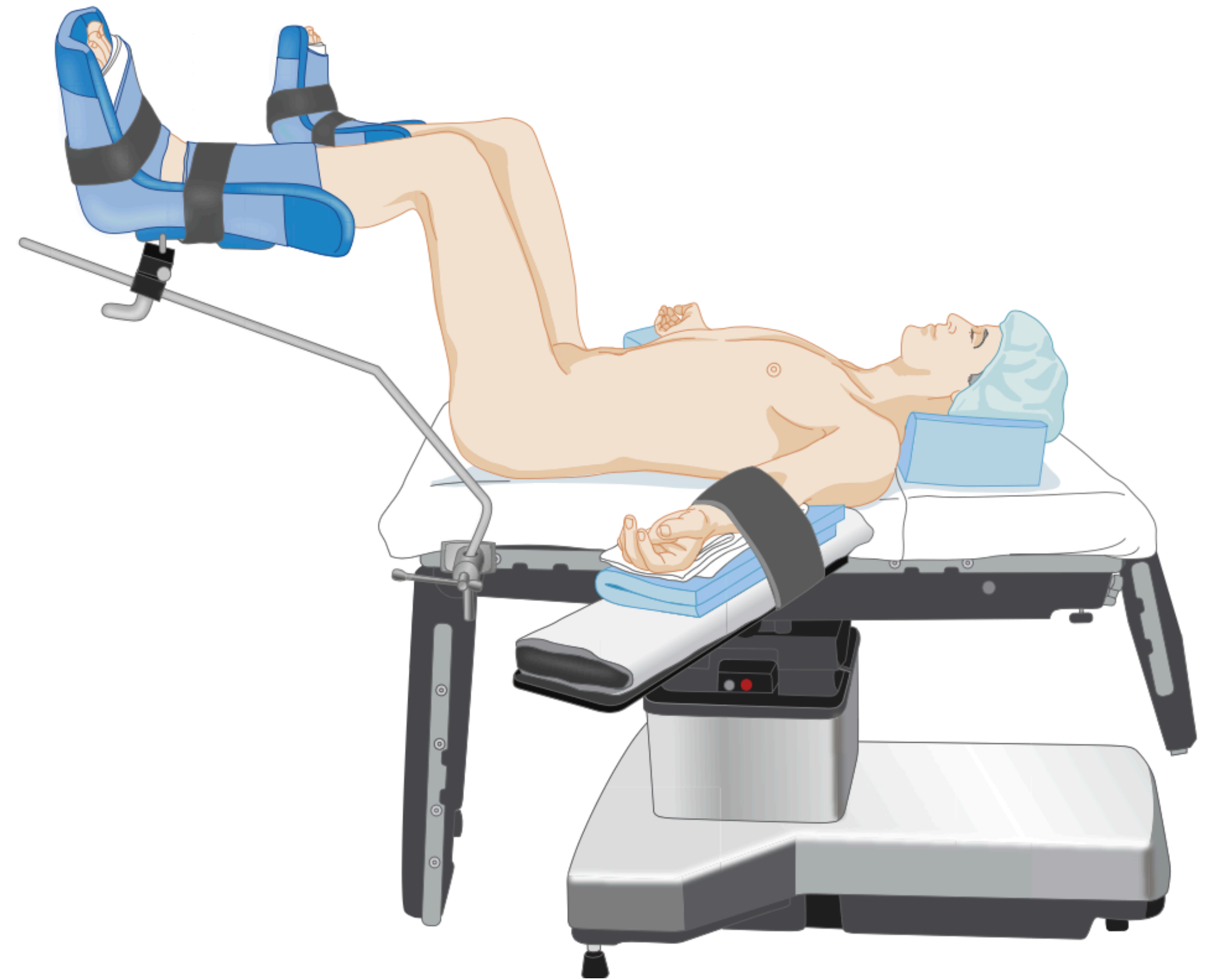
- Hct baseline : 33-34%, no anemic symptom, minimal on going bleed per vagina

Surgical factor

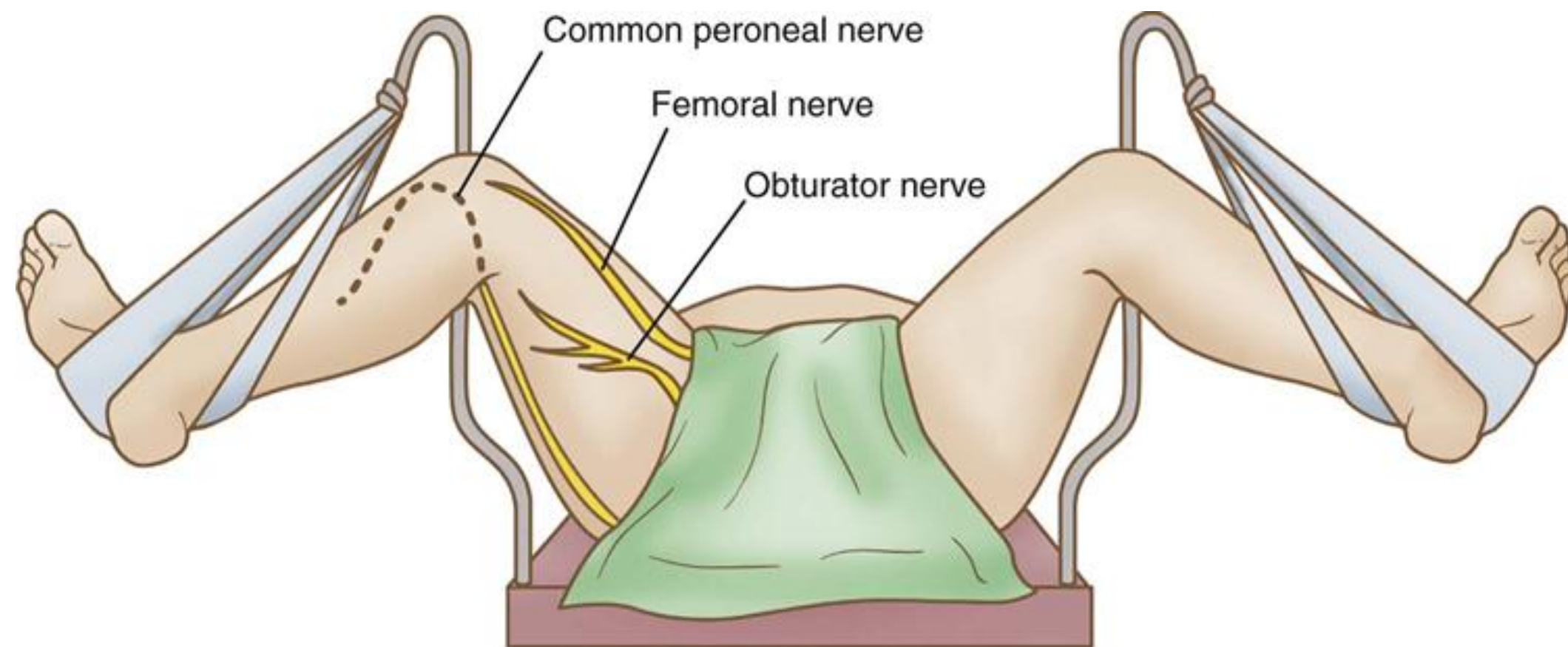
- **Position** (Lithotomy and Steep trendelenburg position)

Lithotomy

- Genital and urologic access
- **Cardiovascular system**
 - ↑ venous return -> ↑ CO (transient)
- **Respiratory system**
 - ↑ intraabdominal p.-> displace diaphragm
 - > ↓ lung compliance & TV



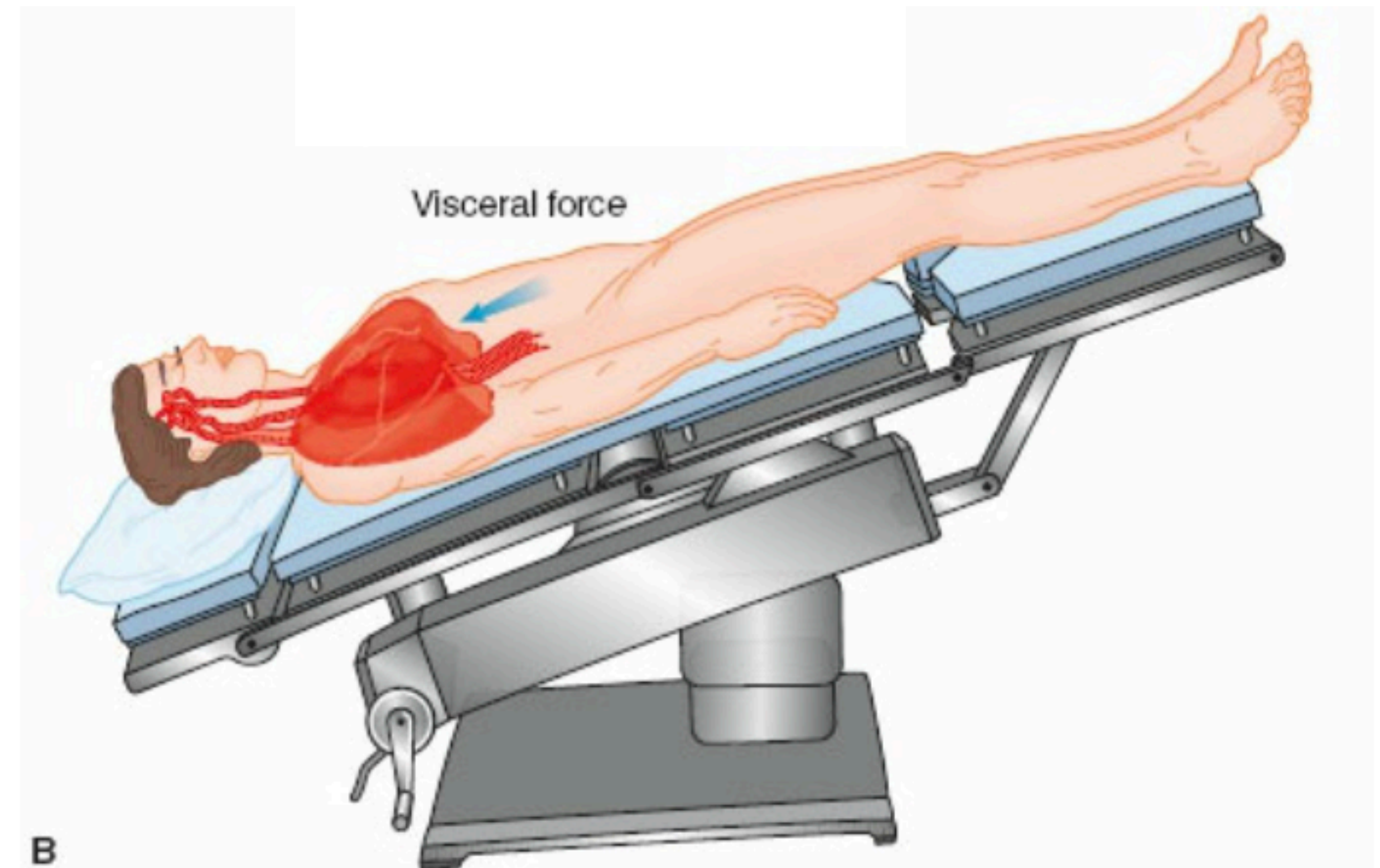
Lithotomy



- Common peroneal nerve injury
 - foot drop
 - inability to extend the toe
 - evert the foot
- Compartment syndrome (rare)
 - ischemia
 - edema
 - Rhabdomyolysis

Steep Trendelenburg

- 30–45 degrees head-down position
- Uterine or prostate surgery
- **Cardiovascular system**
 - ↑ CO
- **Respiratory system**
 - ↓ FRC
- **Increased ICP, IOP**



Anesthetic factor

- **Pneumoperitonium** -> ↑ Intra-abdominal pressure
- **PONV**

Pneumoperitonium

○ Laparoscopic surgery

-Exposure of intraperitoneal space

: Pneumoperitoneum

: External abdominal wall retraction



Insufflation gases

-CO₂

-N₂O

-Helium

Pneumoperitonium

○ CO₂ insufflation

ADVANTAGES

- Nonflammable, nonoxidizing
- Safe to use during electrocautery
- Highly soluble in blood -> rapid pulmonary removal
- Low risk CO₂ embolization

DISADVANTAGES

- Local and systemic effects

Pneumoperitonium

- **IAP (intra-abdominal pressures) < 15 mmHg**
 - ↓ CO₂ related complication
 - ↓ Cardipulmonary instability

Hypercarbia

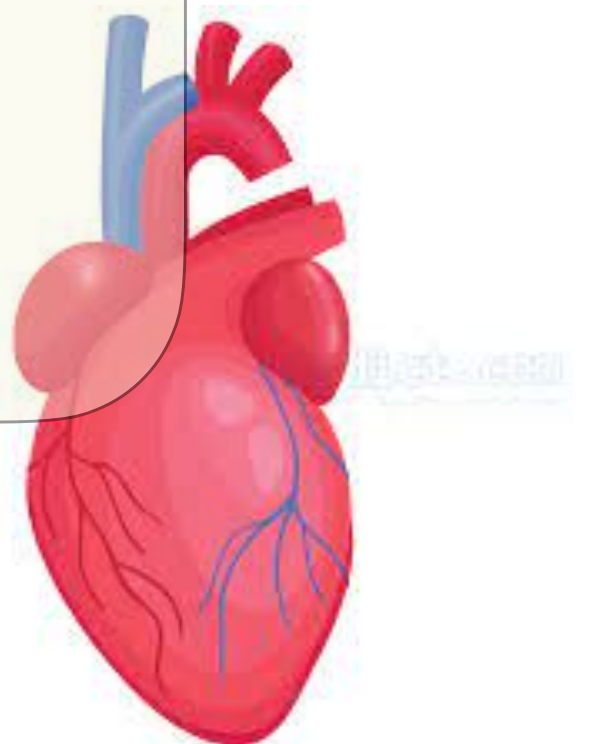
- **CO₂ insufflation** → CO₂ gas absorption
 - **Mild hypercarbia (PaCO₂ 45-50 mmHg)**
 - : minimal hemodynamic change
 - : rightward shift of oxyhemoglobin dissociation curve → improve oxygenation
 - **Severe hypercarbia (PaCO₂ 55-70 mmHg) + Acidosis**
 - : myocardial depression, dysrhythmia
 - : peripheral vasodilatation
 - : hypercarbia-induced pulmonary vasoconstriction → ↑ RV afterload

Physiologic impact of laparoscopic

- **Cardiovascular effect**
- **Respiratory effect**
- **Regional perfusion effect**

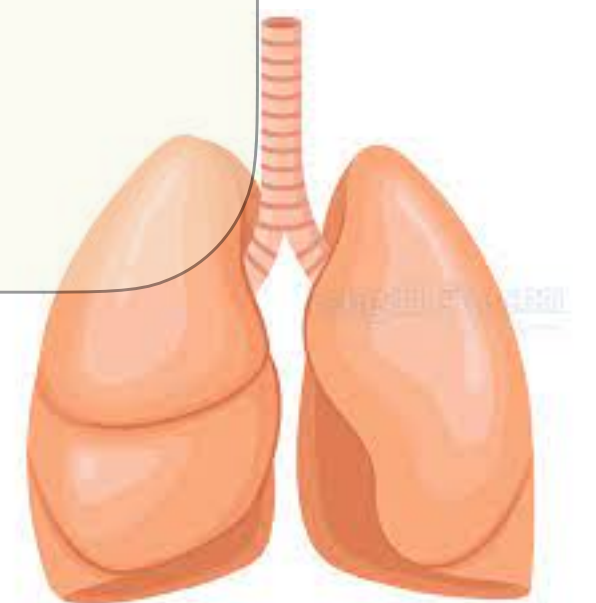
↑ IAP : Cardiovascular effect

- IVC compression : ↓ venous return → ↓ CO
- ↑ Vascular resistant : ↑ afterload → ↑ SVR → ↑ BP
- Stimulation abdominal viscera → ↑ neurohormonal factor
(vasopressin, RASS)



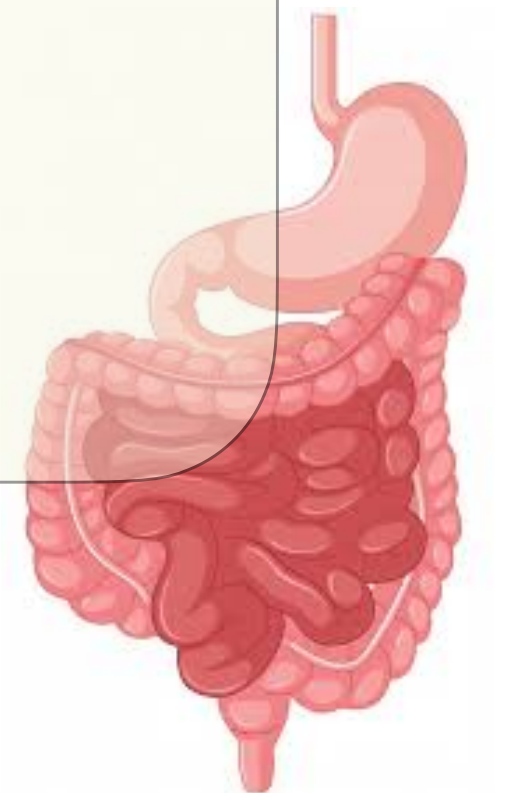
↑ IAP : Respiratory effect

- ↓ Lung compliance
- ↓ Lung volume
- ↑ Airway pressure
- Diaphragm elevated : atelectasis, V/Q mismatch , hypoxia



↑ IAP : Regional perfusion effect

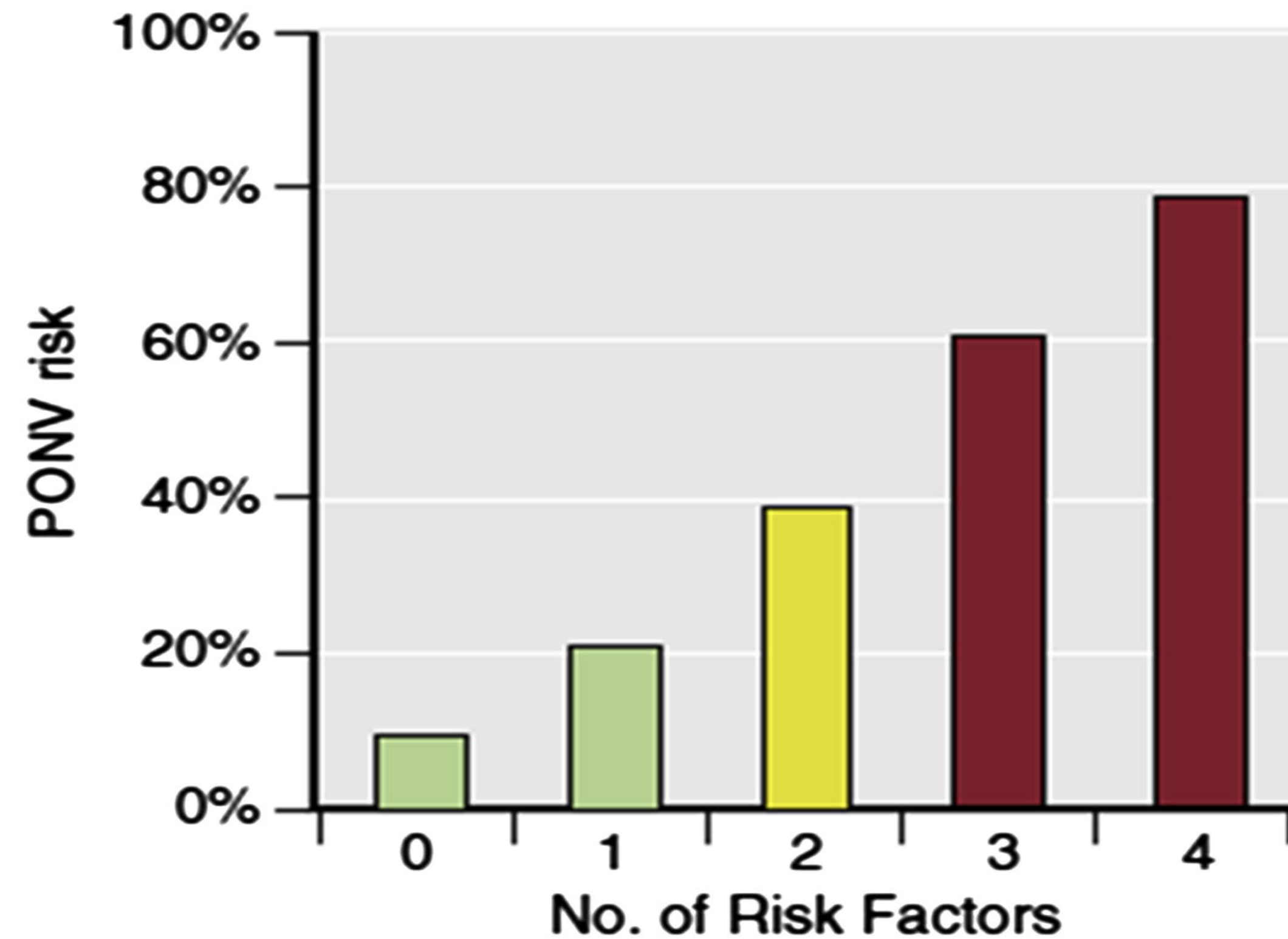
- ↓ Splanchnic blood flow
- ↓ Renal blood flow → ↓ GFR & urine output
- ↑ CPP → ↑ ICP
- ↑ IOP



Anesthetic factor

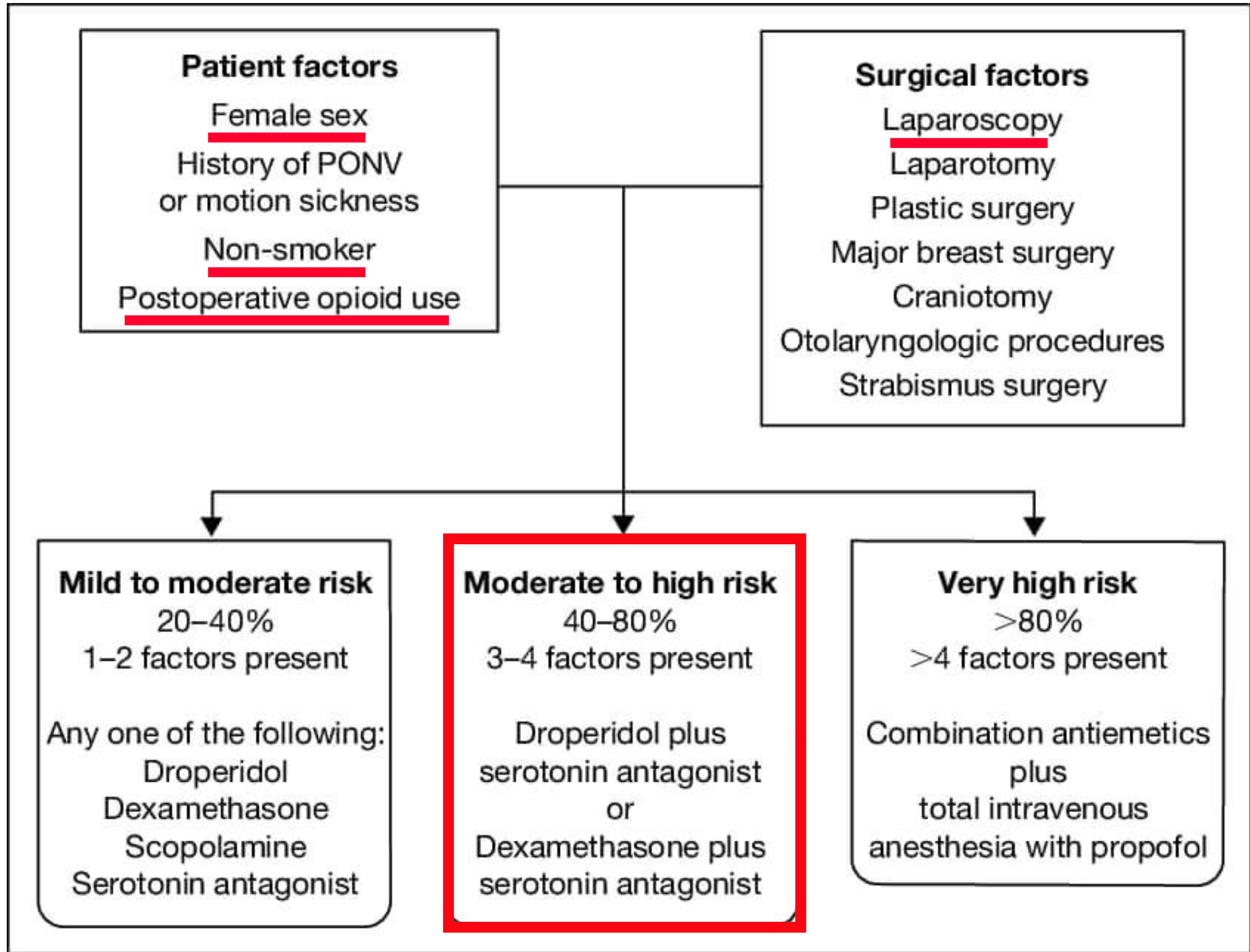
○ PONV : Apfel score

Risk factors	Points
Female gender	1
Nonsmoker	1
History of PONV	1
Postoperative opioids	1
Risk score =	0...4



PONV related risk factor

Category	Risk factors
Patient related	Female gender History of PONV Motion sickness Nonsmoking status Age <50 years
Anesthesia related	Prolonged duration of anesthesia Intraoperative and postoperative opioid analgesics Volatile agents Nitrous oxide (>50%) Increased doses of neostigmine (>3 mg)
Surgery related	Prolonged surgery procedures Type of surgery (e.g., neurosurgery, intra-abdominal surgery)



Choice of anesthesia

General anesthesia

VS

Regional anesthesia

Choice of anesthesia

General anesthesia

VS

Pneumoperitonium

- Discomfort from abdominal distension
- Respiratory distress

Regional anesthesia



Choice of anesthesia

○ General anesthesia with ETT

- Discomfort from pneumoperitoneum
- Discomfort from extreme positioning
- Prolong operative times
- Controlled hemodynamics
- Controlled mechanical ventilation

Preparation

- NPO
- Informed consent
- Standard monitoring : NIBP, EKG, O₂sat, body temperature
- Warm IV fluid and Large bored IV
- G/M PRC 1 U

- Anesthetic machine
- IV anesthetic drugs
- Vagolytic drug
- NG tube
- Premedication : Olanzapine(5)
1 cap 1 hr ก่อนมา OR

ANESTHESIOLOGY

Olanzapine for the Prevention of Postdischarge Nausea and Vomiting after Ambulatory Surgery

A Randomized Controlled Trial

Jaime B. Hyman, M.D., Chang Park, M.D.,
Hung-Mo Lin, Ph.D., Beatriz Cole, M.D.,
Leigh Rosen, M.D., Suzanne S. Fenske, M.D.,
Rachel L. Barr Grzesh, M.D., Stephanie V. Blank, M.D.,
Sylvie B. Polsky, M.D., Matthew Hartnett, B.S.,
Peter J. Taub, M.D., Vijay Palvia, M.D.,
Samuel DeMaria Jr., M.D., Charles Ascher-Walsh, M.D.

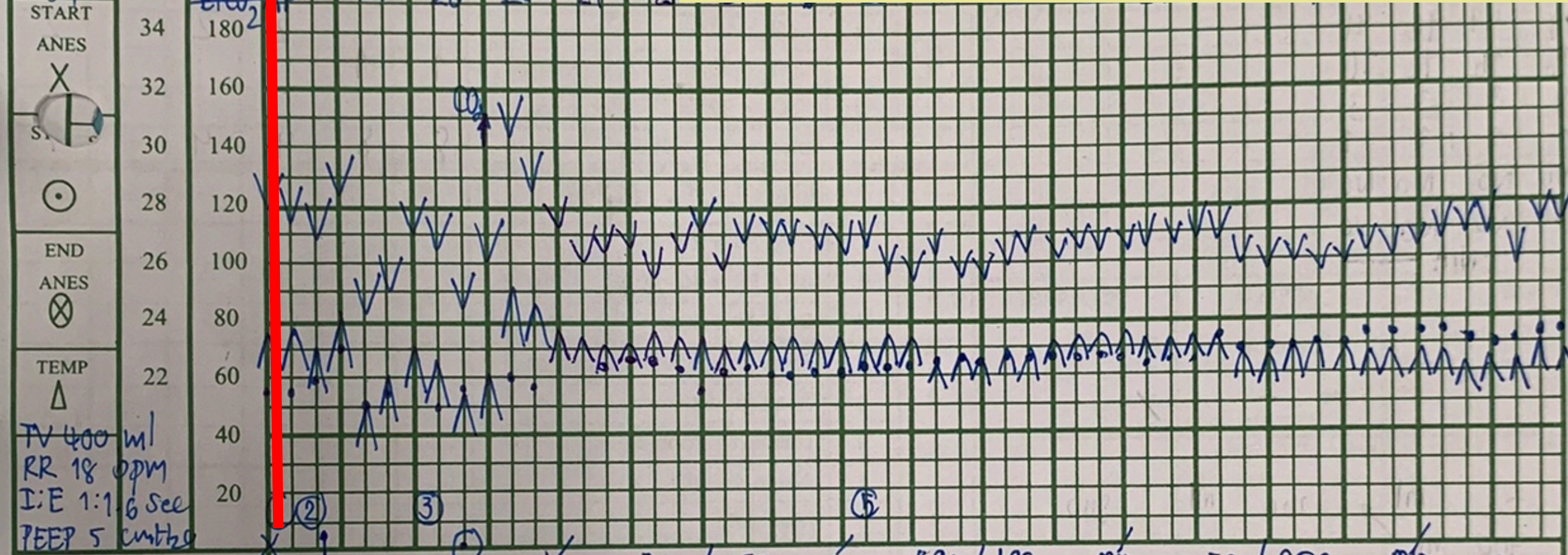
ANESTHESIOLOGY 2020; 132:1419–28

conclusions: When combined with ondansetron and dexamethasone, the addition of olanzapine relative to placebo decreased the risk of nausea and/or vomiting in the 24h after discharge from ambulatory surgery by about 60% with a slight increase in reported sedation.

AGENTS/TIME	14.00	15.00	16.00	17.00	18.00
N ₂ O	X	X	X	X	X
O ₂	X	X	X	X	X
Sevoflurane %	6-01	0	0	0	0
Fentanyl mcg	50				
NimbeX	8				
Morphine mg		4			
Ephedrine mg		6	6		
O ₂ sat %	98	99	100	100	100

IV FLUID INTAKE	in OR	14.00	U.
Acetate	700		
Acetate			

BP	C	240	220	200	180	160	140	120	100	80	60	40	20
120/74	ETCO ₂	32	25	30	31	37							
54	ETCO ₂	20	20	28	24	23							



FIC	URINE	BLOOD	FLUID
inc	250 ml	300 / 550 ml	60 / 600 ml
			50 / 600 ml
			5x DN ₂ 900 ml (hold)

• In OR at 14.00
 • Monitor: NIBP, EKG, O₂sat, ETCO₂, Temp
 • BP 120/74 mmHg, PR 54 bpm, EKG SR, O₂sat 98%
 • IV No.22 LA- 5%DN/2 ยกมา 900 ml(hold)

CONSENT	
<input checked="" type="checkbox"/>	YES
<input type="checkbox"/>	NO

<input type="checkbox"/>	TRENDEL
<input type="checkbox"/>	Rt.LATERAL
<input type="checkbox"/>	Lt.LATERAL
<input type="checkbox"/>	JACK-KNIFE
<input type="checkbox"/>	OTHER

LAB	
<input type="checkbox"/>	Hct.
<input type="checkbox"/>	Blood Sugar
<input type="checkbox"/>	Electrolyte
<input type="checkbox"/>	ABG

TOTAL URINE OUTPUT	900 ml
--------------------	--------

IV. CATH. NO. 22, 18 SITE LA, LH

AGENTS/TIME		14.00	15.00	16.00	17.00	18.00
N ₂ O		X	X	X	X	X
O ₂		6	0	0	0	0
Sevoflurane	%	2	1	1.5	1.5	1.5
Fentanyl	mcg	50				
Nimbe X		8				
Morphine	mg		4			
Ephedrine	mg		6	6		
O ₂ sat	%	98	100	100	100	100
IV FLUID INTAKE		Acet 700	ml	Acet 700	ml	
BP	C	120/74	120/74	120/74	120/74	120/74
PULSE		54	54	54	54	54
START ANES		X				
END ANES						
TEMP						
TV 400 ml						
RR 18 rpm						
I:E 1:1.6						
PEEP 5 cmH ₂ O						
FIC	URINE	inc	250	ml	300 / 550	ml
BLOOD					60 / 600	ml
FLUID					50 / 600	ml
TOTAL URINE OUTPUT						900 ml
IV. CATH. NO.			22, 18			
SITE			LA, LH			

●At 14.10

- Preoxygenation 5min
- Fentanyl 50 mcg
- Induction agent: propofol 100+30 mg
- Intubation agent: succinylcholine 75 mg
- Cisatracurium 8 mg

●Intubation at 14.10

- ETT No.7.5 depth 20 cms
- Maintenance-N2O:O2:sevoflurane= 1:1:up to 2%

●Ventilation setting : VCV mode, TV 400ml, RR 18/min, I:E 1:2, PEEP 5 cmH2O

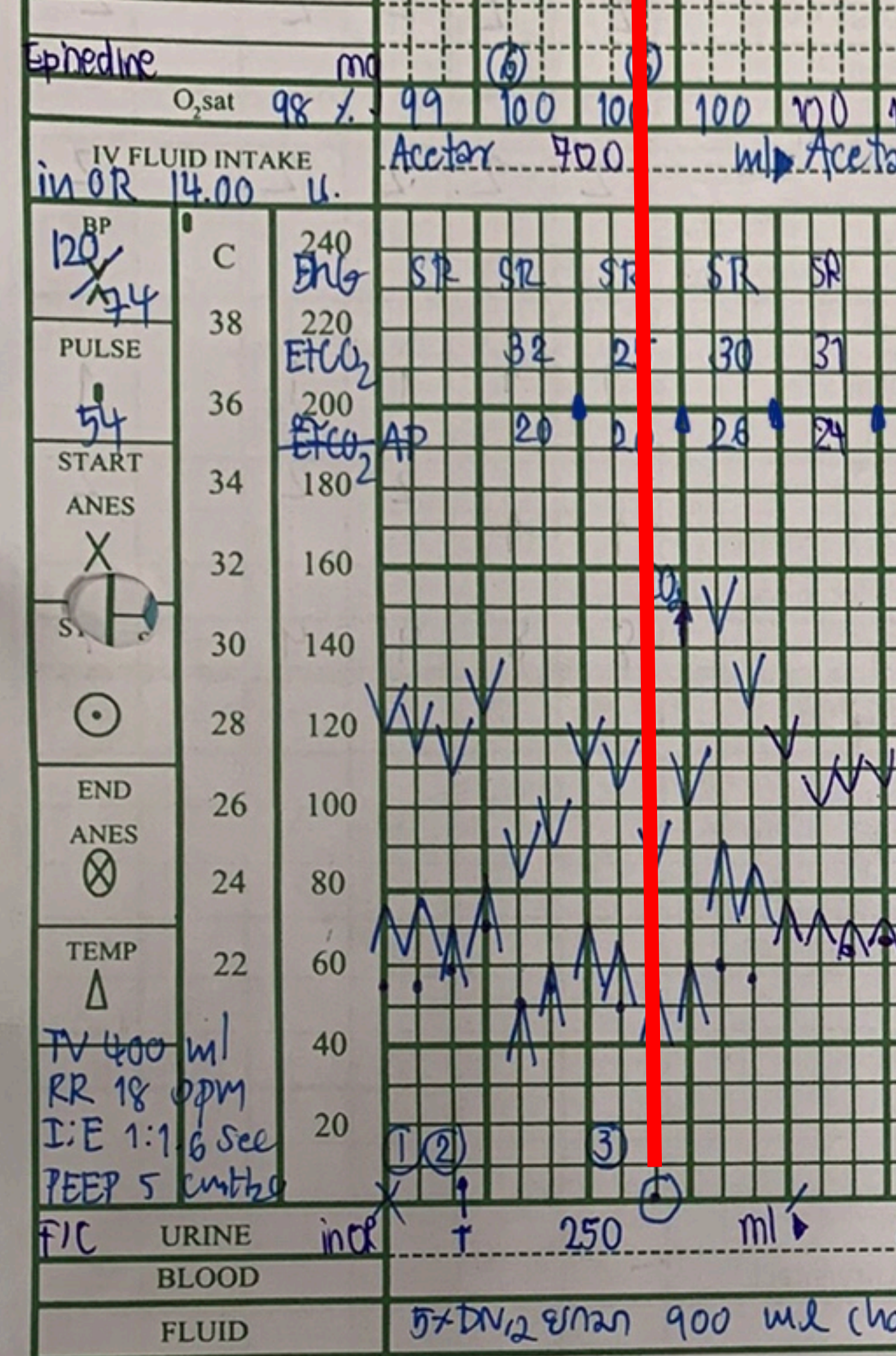
- Dexamethasone 10 mg iv after induction

AGENTS/TIME	14.00	15.00	16.00	17.00	18.00
N ₂ O	X	X	X	X	X
O ₂	6-01	0	0	0	0
Sevoflurane %	2	5			
Fentanyl mcg	(50)		(2)	(2)	(2)
Nimbe X	(8)				
Morphine mg		(4)			
Ephedrine mg	(6)	(6)			
O ₂ sat %	98	99	100	100	100

YES
 NO
 PRE - OP VISIT
 YES

•At 14.40 : start operation
 -BP 90/45 mmHg, PR 55 bpm, EKG SR,
 O₂sat 100%,
 -ETCO₂: 25, AP:20

•AT 14.45 CO₂ insufflation
 -AP: 20-> 26
 -ETCO₂: 25->30



LAB
 Hct.
 Blood Sugar
 Electrolyte
 ABG
 TOTAL URINE OUTPUT 900 ml

IV. CATH. NO. 22, 18 SITE LA, LH

AGENTS/TIME		18.30	19.00	20.00	21.00
N ₂ O		1-X	A	A	A
O ₂		1-0	2-0	1-0	1-0
Sevo		1.5	2	2	2
mimbex	mg		(2)		
Fentanyl	mcg				(50)
O ₂ sat		100	100	100	100
IV FLUID INTAKE		Acetar 200 ml	Acetar 100 ml	Acetar 200 ml	
BP	C	240	SR	SR	SR
PULSE		37	37	36	39
ETCO ₂		37	37	36	39
AP		94	21	23	27
TEMP		36	36	36	36
URINE		100 ml	150 ml	850 ml	900 ml
BLOOD					

• Total operation time 6 hr 15 min

-Reverse: neostigmine 2.5 mg+atropine 1.2 mg

-Cisatracurium : 20 mg

-Narcotic drug : fentanyl 100 mcg, morphine 4 mg

-Dynastat 40 mg iv at 19.00

-LA 0.5%marcaine 20 ml surgical site

-Ephedine 12 mg

-Total fluid: Acetar 2,000 ml

-Blood loss 300 ml

-Urine output 900 ml

Intraoperative complication

- **Intra-abdominal injuries**

 - : vascular

 - : GI & GU structure

- **Cardiopulmonary**

 - : Hyper/hypotension

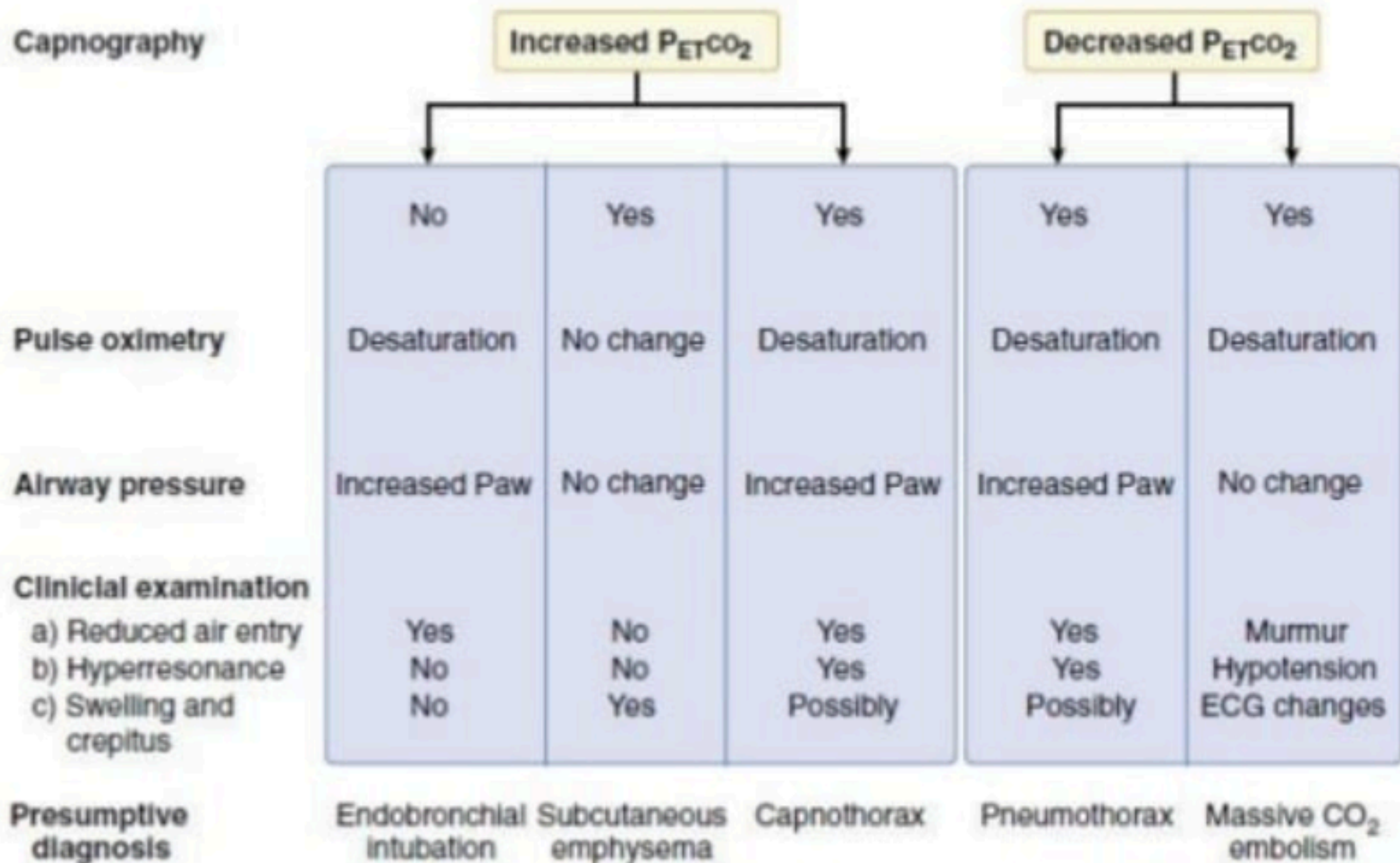
 - : Vascular collapse

 - : Hypercarbia, hypoxemia

Intraoperative complication

- **CO₂ extravasation**
 - : **Subcutaneous emphysema**
 - : **Capnothorax**
 - : **Venous gas embolism**

Diagnosis of respiratory complications during laparoscopy



Post operative day 1

S : ผู้ป่วยตื่นดี PS 2/10 ปวดมากขึ้นเวลาขยับ PS 4/10 ไม่มีอาการคลื่นไส้ อาเจียน ไม่มีอาการคันตามตัว ไม่มีแน่นหน้าอก ไม่มีหายใจหอบเหนื่อย กดPCA: morphine(1mg/ml) 4 ครั้ง

O : V/S : BT 36.6 °C BP 107/76 mmHg. PR 62 bpm RR 18/min

GA : good consciousness

HEENT : not pale conjunctivae, anicteric sclerae

Heart : Normal S1S2, no murmur

Lungs : clear, equal BS

Abd : distension , no guarding

A+P : Adenomyosis with multiple leiomyoma S/P TLH c BS POD 1

- control pain : ketorac 30 ml iv ตอนเช้า

: paracetamol(500) 1x3 po pc

: Ibuprofen(400) 1x3 po pc เริ่มเมื่อเย็น

Post operative day 2

S : ผู้ป่วยตื่นดี ไม่มีอาการปวดแผล ถ้าขยับ PS 2/10 ลุกเดินรอบห้องได้ ไม่มีอาการคลื่นไส้ อาเจียน ไม่มีอาการคันตามตัว ไม่มีแน่นหน้าอก ไม่หายใจหอบเหนื่อย

O : V/S : BT 36.8 °C BP 108/70 mmHg. PR 80 bpm RR 18/min

GA : good consciousness

HEENT : not pale conjunctivae, anicteric sclerae

Heart : Normal S1S2, no murmur

Lungs : clear, equal BS

Abd : soft , no gaurding

A+P : Adenomyosis with multiple leiomyoma S/P TLH c BS POD 2

- control pain: paracetamol(500) 1x3 po pc

: Ibuprofen(400) 1x3 po pc

: off PCA

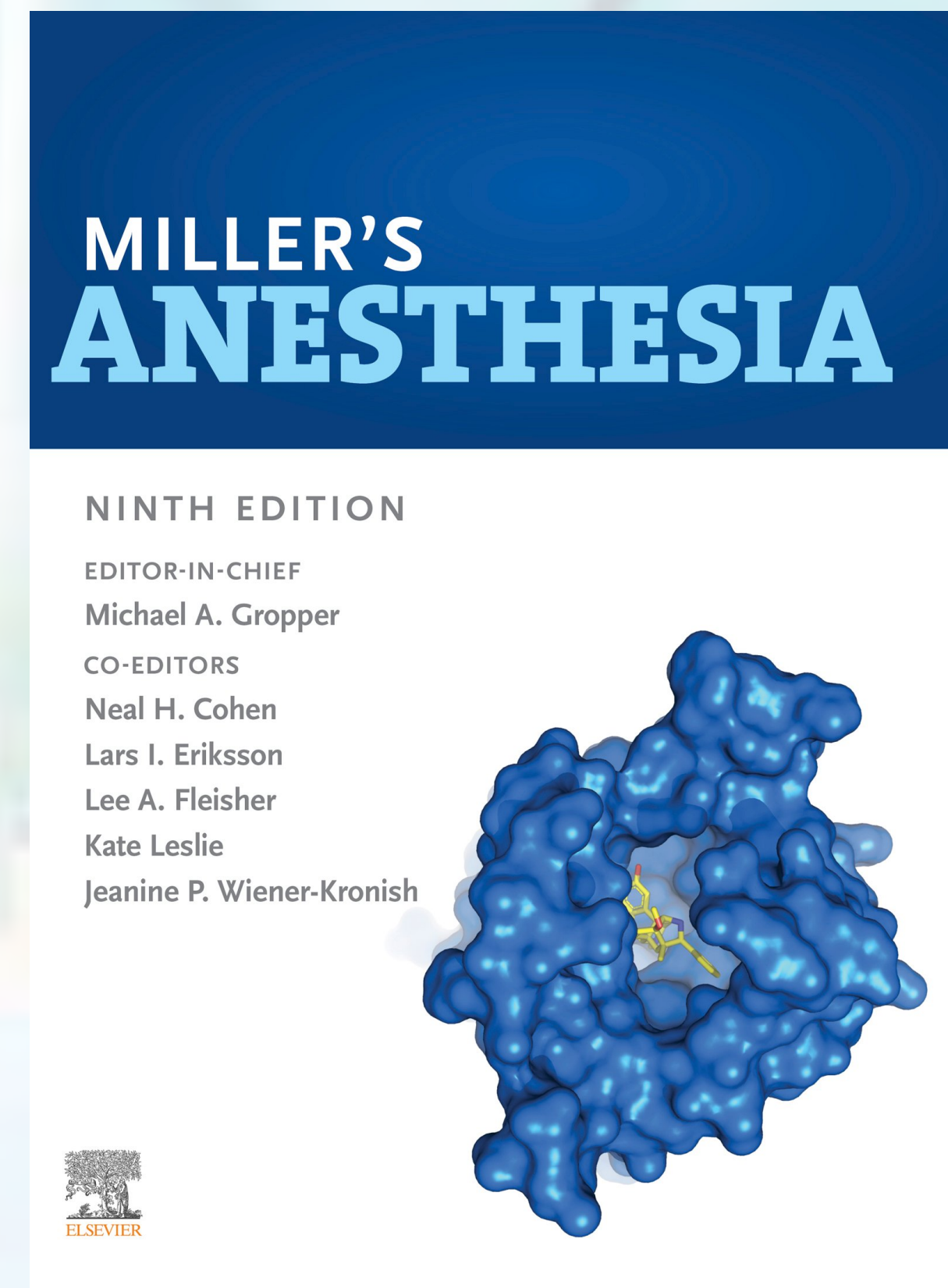
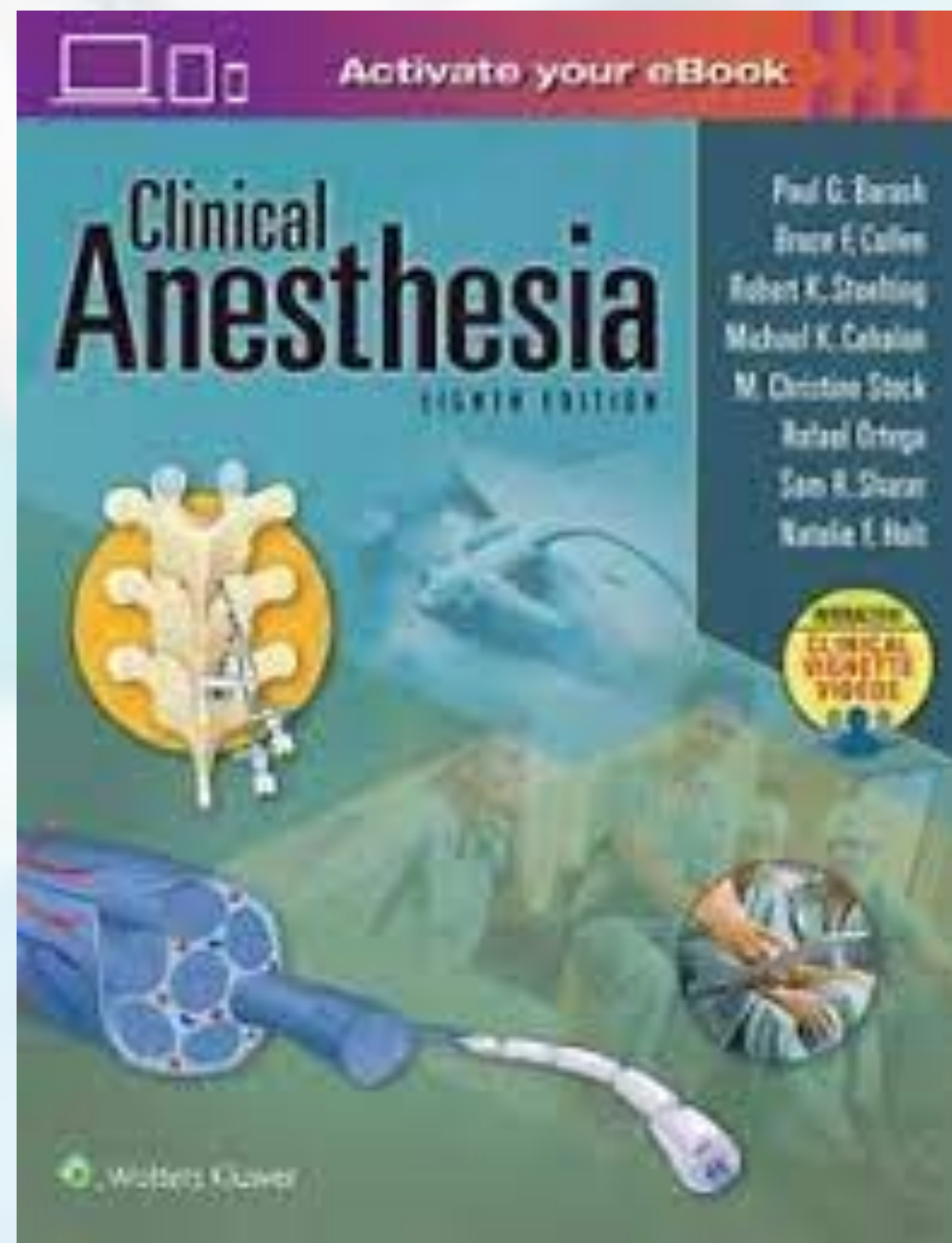
: plan D/C พรุ่งนี้

TAKE HOME MESSAGES

- Pneumoperitonium and position-related physiologic change
- Intraop& postoperative complication, management
- Perioperative use of multimodal analgesia
- Postoperative nausea and vomiting prophylaxis

References

- Clinical anesthesia/edited by Paul G. Barash 8th ed.
- Miller's Anesthesia 9th





THANK YOU