



# **C a s e   D i s c u s s i o n**

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# Case

A 60 years old man

Diagnosis : Cholangitis with gall stone

Operation : Laparoscopic cholecystectomy

# Patient history

Chief complaint : abdominal pain 2 months PTA

## Present illness:

2 months PTA he presented with fever, right upper abdominal pain, nausea, vomiting ,anorexia and jaundice.His mental status was normal. Treatment by ERCP with stone removal at private hospital.

Today he admit for elective surgery , clinical stable , no fever, no abdominal pain and no jaundice



# Past History



## Underlying disease

- HT
- Type2 DM
- DLP


## Current medications

- Amlodipine (10) 1\*1 opc
- Metformin(500) 1\*1opc
- Simvastatin(10) 1\*1 ohs



# Past History



- No history of drug and food allergy
  - No history of alcohol drinking
  - No history of smoking
  - Previous surgery :
    - ERCP with stone removal under TIVA 6 Dec 2021
  - NPO AMN
  - Functional class I
- 



# **Cholangitis**

# Definition

- Inflammation of the bile duct due to bacterial infection ascending from duodenum
- Superimposed on an obstruction of the biliary tree
- Cause of obstruction
  - Gall stone (50%)
  - Benign biliary stricture (20%)
  - Malignant (10-20%)

# Key Clinical features

- Charcot's triad
  - RUQ pain
  - Fever
  - Jaundice
- Reynold's pentad
  - Charcot's triad + shock+ alternation of consciousness



# Management

- Resuscitation including fluid and IV ATB
- Biliary drainage : time depend on severity
  - Mild to moderate : responsive to ATB within 24-48 hr
  - Severe : not responsive to ATB, urgent drainage within 24 hr
  - ERCP is preferred method : where not possible, percutaneous or surgical drainage
- Treatment of predisposing cause
  - Gall stone : consider cholecystectomy following resolution
  - Benign stricture : stenting or surgical repair



**Physical**

**Examination**

# Physical Examination

- Vital signs
  - BP 143/79 mmHg      PR 76 BPM
  - BT 36.7°C              RR 18/min
- BW 75 kg, height 166 cm (BMI 27.21 kg/m<sup>2</sup>)
- GA : An old Thai male, good consciousness, well co-operated
- HEENT : not pale conjunctivae, no icteric sclerae

# Physical Examination

- Airway examination
  - Mouth opening  $> 3$  cm
  - Prominent incisor : no
  - 1 broken tooth at upper incisor
  - Upper lip bite test : class 1
  - Mallampati grade : grade 2
  - Thyromental distance  $> 6$  cm
  - Limit neck of motion : no

# Physical Examination

- Heart : pulse full, regular, normal S1 and S2, no murmur
- Lung : equal breath sound both lungs , no adventitious sound
- Abdomen : normoactive BS, soft, no tenderness
- Neuro : E<sub>4</sub>V<sub>5</sub>M<sub>6</sub>, pupil 2 mm RTLBE, sensory intact
- Extremities : no pitting edema



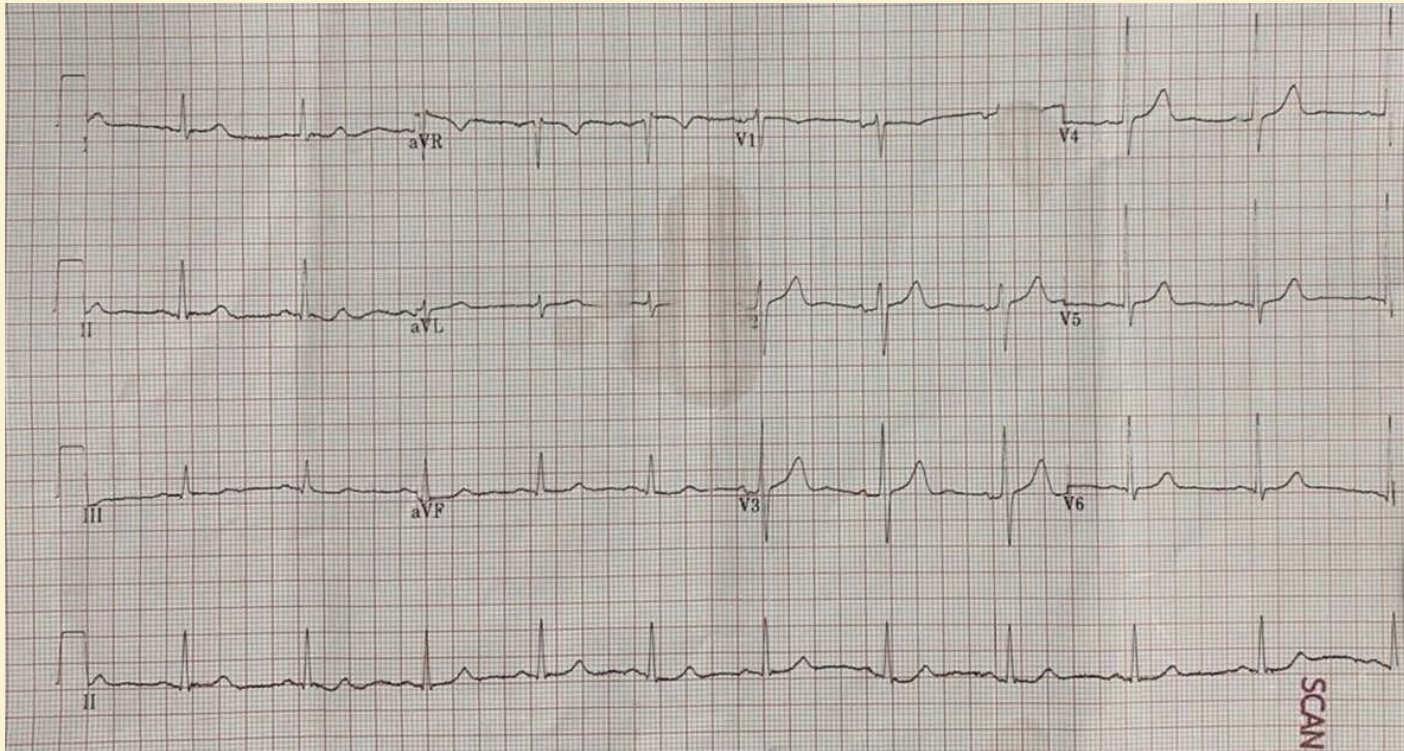
# **Investigation**

# Investigation

- CBC: Hb 14.9 gm/dl HCT 44.4 % platelet 238,000/mm<sup>3</sup>
- Electrolytes: Na 141.2 meq/l K 3.86 meq/l Cl 102.6 meq/l CO<sub>2</sub> 27.3 meq/l
- BUN: 20.9 mg/dl Cr: 0.9mg/dl GFR: 92.51 ml/min/1.73m<sup>2</sup>
- HbA1C 6.1
- LFT :AST 25.20 U/L ALT 27.10 U/L ALP 56 U/L TB 0.64 mg/dl DB 0.21 mg/dl
- Covid PCR : not detected

# Investigation

- EKG : NSR , HR 66 bpm, No ST-T change





# Investigation

- CXR : No infiltration, no cardiomegaly



# Investigation

- U/S upper abdomen : **dilated CBD 0.8 cm** without cave of obstruction, **gall bladder mass** site 2.0\*1.2 cm






**Problem  
Lists**



# **Problem lists**



- Cholangitis with gall stone
  - Underlying disease
    - Hypertension
    - Type2 DM
- 



**ASA**

- ASA class II

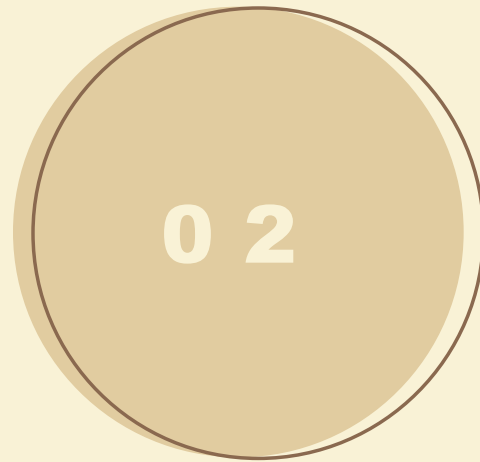


**Preoperative  
Evaluation**

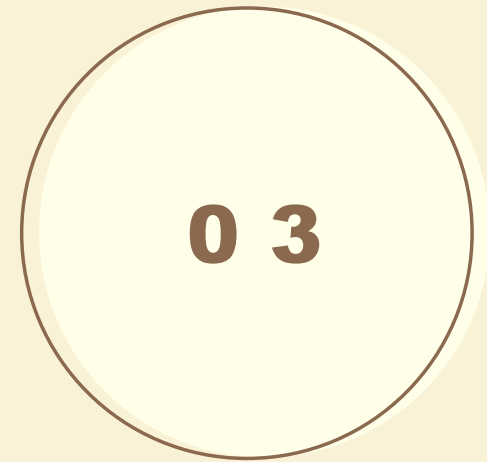
# Preoperative Evaluation



Patient factors



Surgical factors



Anesthetic factors

# P a t i e n t F a c t o r s

- Cholangitis with gall stone
- HT
- Type2 DM





# Cholangitis with gall stone

- Normal LFT
- Clinical stable
- No clinal sepsis or septic shock

# Hypertension

- Baseline BP 130-140/70-80 mmHg
- No systemic complication
- No history of MI or stroke
- Current medication
  - Amlodipine(10) 1\*1 opc

# Type2 DM

- Last HbA1C 6.1
- No stiff joint syndrome
- No peripheral neuropathy
- No diabetic nephropathy
- Current medication : MFM(500) 1\*1 opc
- Premed : 5% DN/2 1000 ml+KCl 20 meq+RI 6 U IV 60 ml/hr
- Plan F/U DTX intraop q 1-2 hr keep 110-180 mg%

# Surgical Factors

- Laparoscopic surgery



# Laparoscopic Surgery

- Insufflation of intraperitoneal gas
  - Pneumoperitoneum
  - External abdominal wall retraction
- Insufflation gas : CO<sub>2</sub>
  - Safety
  - Non-flammable/inert gas
  - Highly soluble in blood /rapid pulmonary removal
- Intraabdominal pressure  $\leq 15$  mmHg
  - ↓ CO<sub>2</sub> related complication
  - ↓ Cardiopulmonary instability



# Laparoscopic Surgery

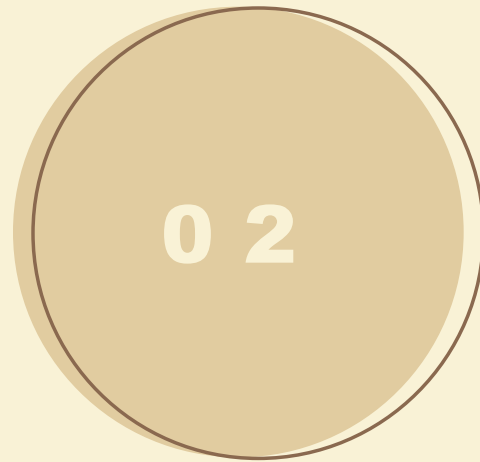
## Concerns

- Physiologic effects of pneumoperitoneum
- Absorption of CO<sub>2</sub>
- Position
- Long operative time
- Limited access to patients

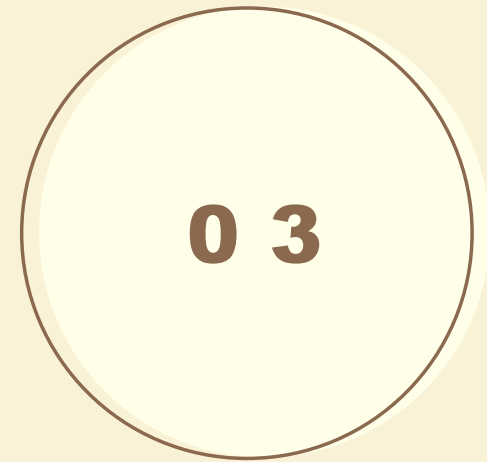
# Physiologic effects of pneumoperitoneum



Cardiovascular  
effect

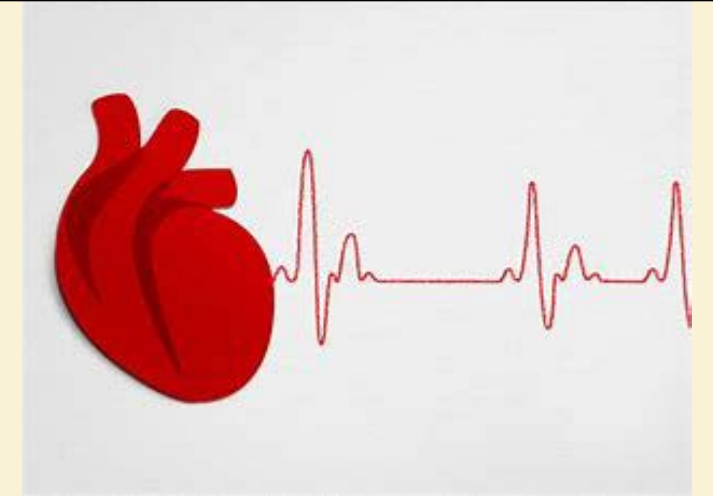


Respiratory  
Effect



Regional perfusion  
Effect

# Cardiovascular Effect



- IVC compression  $\rightarrow$   $\downarrow$  venous return  $\rightarrow$   $\downarrow$  CO
- Stimulation abdominal viscera  $\rightarrow$   $\uparrow$  neurohormonal factor (vasopressin, RAAS)
- $\uparrow$  Vascular resistant  $\rightarrow$   $\uparrow$  afterload  $\rightarrow$   $\uparrow$  SVR  $\rightarrow$   $\uparrow$  BP



# Respiratory Effect

- ↓ Lung Compliance
- ↓ Lung volume
- ↑ Airway pressure
- Elevated diaphragm elevated : atelectasis, V/Q mismatch, hypoxemia



# Regional Perfusion Effect

- ↓ splanchnic blood flow
- ↓ renal blood flow → ↓ GFR & urine output
- ↑ CPP → ↑ ICP

# Absorption of CO<sub>2</sub>

- **CO<sub>2</sub> Insufflation** : CO<sub>2</sub> gas absorption
  - Mild hypercarbia (PaCO<sub>2</sub> 45-50 mmHg)
    - Minimal hemodynamic change
    - Rightward shift of oxyhemoglobin dissociation curve : improve oxygenation
  - Severe hypercarbia (PaCO<sub>2</sub> 55-70 mmHg)
    - Myocardial depression, dysrhythmia
    - Peripheral vasodilatation
    - Hypercarbia-induced pulmonary vasoconstriction → ↑ RV afterload

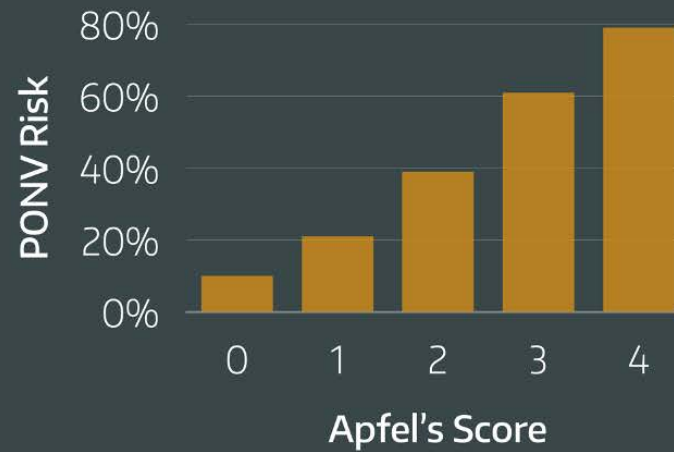
# Position

- Reverse trendelenburg
  - Arm trucked at patient's sides
  - Longer surgical procedures
- Goal
  - Prevention of injuries to peripheral nerve and bony prominences
  - Pressure points should be padded
  - Secure IV and monitor with tape
  - Avoid having patients slide on the operating
    - Padding and cross-body taping

# Anesthetic Factors

- PONV : Apfel's score

Risk Factor	Points
Female gender	1
Non-smoker	1
History of PONV	1
Postoperative opioids	1
<b>Potential Total</b>	<b>4</b>



# PONV Related Risk factor

- **Patient-specific Risk Factors**

- Age (adult)
- Non-smoking status
- History of PONV / motion sickness
- Predisposing gastric disorders
- Low threshold for nausea
- Preoperative anxiety
- Obesity (disputed in recent studies)
- Gastric distension (disputed in recent studies)

- **Anesthetic Risk Factors**

- Pre-anesthetic medications (opioids, atropine)
- Volatile anesthetics
- Nitrous Oxide
- Intraoperative or postoperative use of opioids
- Duration of anesthesia (> 120 min)

- **Surgical Risk Factors**

- Duration of surgery (each 30 min increases PONV risk by 60%)
- Type of surgery (craniotomy; ear, nose, throat procedures; major breast procedures; strabismus surgery; laparoscopy; laparotomy).
- Intubation (disputed in recent studies)
- Early oral intake



# PONV Related Risk factor

## PONV Prophylaxis Based on Apfel Score

Risk Score	Prevalence PONV	Prophylaxis: No of Anti-emetics	Examples*
0	9%	0-1	± Ondansetron 4 mg
1	20%	1	Ondansetron 4 mg ± Dexamethasone 4mg
2	39%	2	Ondansetron 4 mg +Dexamethasone 4mg ± Propofol infusion
3	60%	3	Ondansetron 4 mg + Dexamethasone 4 mg + Propofol infusion ± Scopolamine patch
4	78%	4	Ondansetron 4 mg + Dexamethasone 4 mg + Propofol infusion + Scopolamine patch

# Choice of Anesthesia

- GA VS RA

	<b>Advantages</b>	<b>Disadvantages</b>
GA	Respiratory changes well tolerated Risk of aspiration minimal to nil	Increased PONV Increased postoperative pain Delayed recovery (especially in compromised, obese, and old)
Regional anesthesia	Cost-effective Avoids polypharmacy and less use of IV analgesia An awake and a spontaneously breathing patient Faster recovery and ambulation with better postoperative pain relief Fewer postoperative pulmonary complications Nil airway manipulation Decreased PONV	Cardiorespiratory changes with PP may manifest as breathlessness and decreased saturation in awake patients Significant hypotension Increased risk of aspiration Risk of postoperative urinary retention Patient anxiety In case of supplemental IV sedation, risk of hypoventilation and desaturation Shoulder discomfort due to diaphragmatic irritation

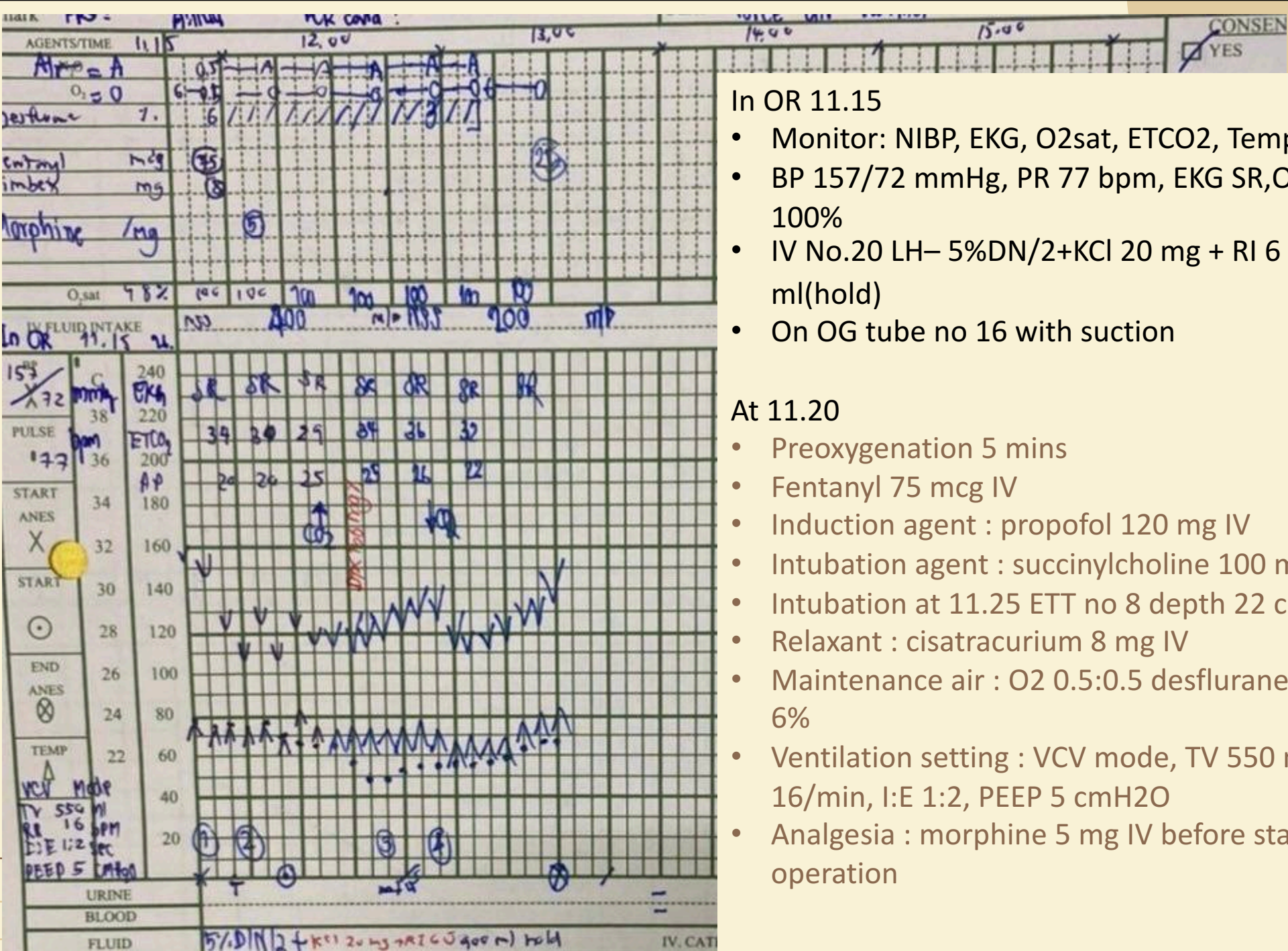


# Choice of Anesthesia

- General anesthesia with ETT
  - Allows optimal ventilatory control and support
  - Allows optimal hemodynamics
  - Prolong operative time

# Preparation

- NPO
- Inform consent
- Standard monitoring :NIBP, EKG, O<sub>2</sub> sat
- Warm IV fluid
- IV anesthetic drugs
- Vagolytic drug
- NG tube

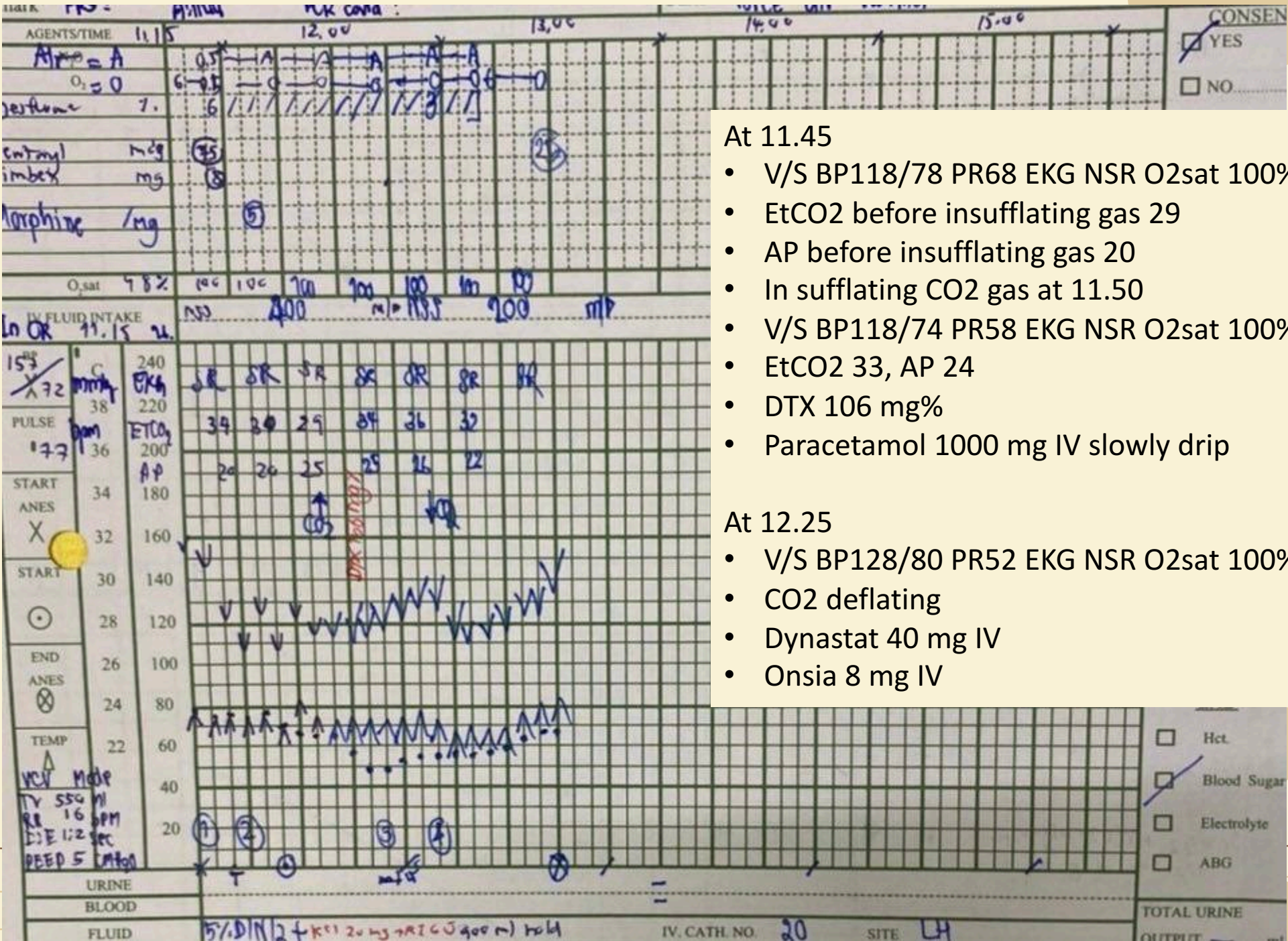


**In OR 11.15**

- Monitor: NIBP, EKG, O<sub>2</sub>sat, ETCO<sub>2</sub>, Temp
- BP 157/72 mmHg, PR 77 bpm, EKG SR, O<sub>2</sub>sat 100%
- IV No.20 LH- 5%DN/2+KCl 20 mg + RI 6 u 900 ml(hold)
- On OG tube no 16 with suction

**At 11.20**

- Preoxygenation 5 mins
- Fentanyl 75 mcg IV
- Induction agent : propofol 120 mg IV
- Intubation agent : succinylcholine 100 mg IV
- Intubation at 11.25 ETT no 8 depth 22 cms
- Relaxant : cisatracurium 8 mg IV
- Maintenance air : O<sub>2</sub> 0.5:0.5 desflurane up to 6%
- Ventilation setting : VCV mode, TV 550 ml, RR 16/min, I:E 1:2, PEEP 5 cmH<sub>2</sub>O
- Analgesia : morphine 5 mg IV before start operation

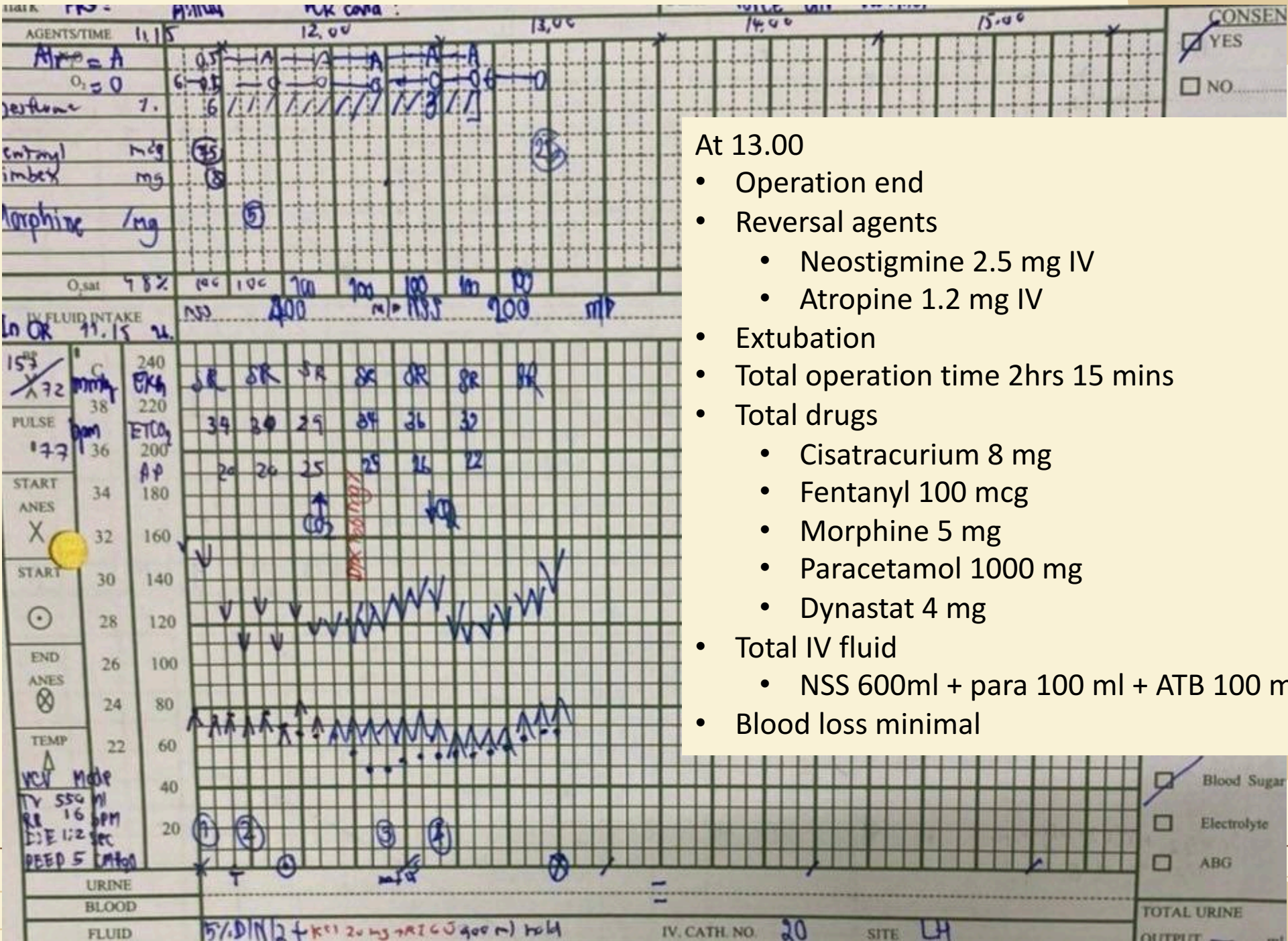


At 11.45

- V/S BP118/78 PR68 EKG NSR O<sub>2</sub>sat 100%
- EtCO<sub>2</sub> before insufflating gas 29
- AP before insufflating gas 20
- In sufflating CO<sub>2</sub> gas at 11.50
- V/S BP118/74 PR58 EKG NSR O<sub>2</sub>sat 100%
- EtCO<sub>2</sub> 33, AP 24
- DTX 106 mg%
- Paracetamol 1000 mg IV slowly drip

At 12.25

- V/S BP128/80 PR52 EKG NSR O<sub>2</sub>sat 100%
- CO<sub>2</sub> deflating
- Dynastat 40 mg IV
- Onsia 8 mg IV



At 13.00

- Operation end
- Reversal agents
  - Neostigmine 2.5 mg IV
  - Atropine 1.2 mg IV
- Extubation
- Total operation time 2hrs 15 mins
- Total drugs
  - Cisatracurium 8 mg
  - Fentanyl 100 mcg
  - Morphine 5 mg
  - Paracetamol 1000 mg
  - Dynastat 4 mg
- Total IV fluid
  - NSS 600ml + para 100 ml + ATB 100 ml
- Blood loss minimal

# Intraoperative Complications

- Physiologic effects of the laparoscopic
  - Hemodynamic compromise (hypertension/hypotension)
  - Respiratory decompensation
- Surgical maneuvers
  - Access-related injury : vascular, solid-organ, bowel injury
- CO<sub>2</sub>
  - Subcutaneous emphysema
  - Intrathoracic spaces—> pneumothorax
  - Gas embolism

# Differential Diagnosis Complications

	EtCO <sub>2</sub>	SpO <sub>2</sub>	Airway pressure	Clinical features
Pneumothorax	↓	↓	↑	↓ Air entry with hyperresonance
SC emphysema	↑	-	-	Swelling and crepitus
Endobronchial intubation	↑/-	↓	↑	↓ Air entry
Gas embolism	↓	↓	-	Murmur Hypotension ECG changes Cyanosis Dysrhythmia Asystole

ETCO<sub>2</sub>: End-tidal CO<sub>2</sub>, SPO<sub>2</sub>: Peripheral capillary oxygen saturation, SC: Subcutaneous, ↑: Increased, ↓: Decreased, -: No change, ECG: Electrocardiogram, CO<sub>2</sub>: Carbon dioxide

# Postoperative Day 1

S : awake , patient can eat well (water, regular diet), mild pain at surgical site (PS 3/10) no nausea or vomiting

O : BT 36.2c BP 141/72 mmHg PR 60 rr 18

A+P : post operative LC day 1

step diet

Pain control : paracetamol 500 mg 1 tab q 6 hr

morphine 3 mg IV prn q 4 hrs



# Postoperative Day 2

S : awake , patient can eat well (regular diet), mild pain at surgical site (PS 1-2/10) no nausea or vomiting

O : V/S : BT 37.1c BP 121/66 mmHg PR 64 rr 18

A+P : plan d/c tomorrow

HM : paracetamol (500) 1 tab oral prn q 6 hrs

cereblex (400) 1x1 popc

F/U 10 days

# Take Home Message

- Physiologic change in laparoscopic surgery
- Goal = intraabdominal pressure (IAP)  $\leq 15$  mmHg to minimize physiologic effects
- Intraoperative complications management
- Mechanical ventilator with control ventilations should be used during pneumoperitoneum
- Multimodal analgesia
- PONV prophylaxis

The image features a minimalist design on a light beige background. A central white rectangular box with a thin brown border contains the text 'THANK YOU' in a bold, dark brown, sans-serif font. The box is layered over a vertical wood-grain pattern. To the left of the box is a solid brown circle, and to the right is a brown semi-circle. Below the box, a larger brown semi-circle is partially visible. The overall aesthetic is clean and modern.

**THANK YOU**