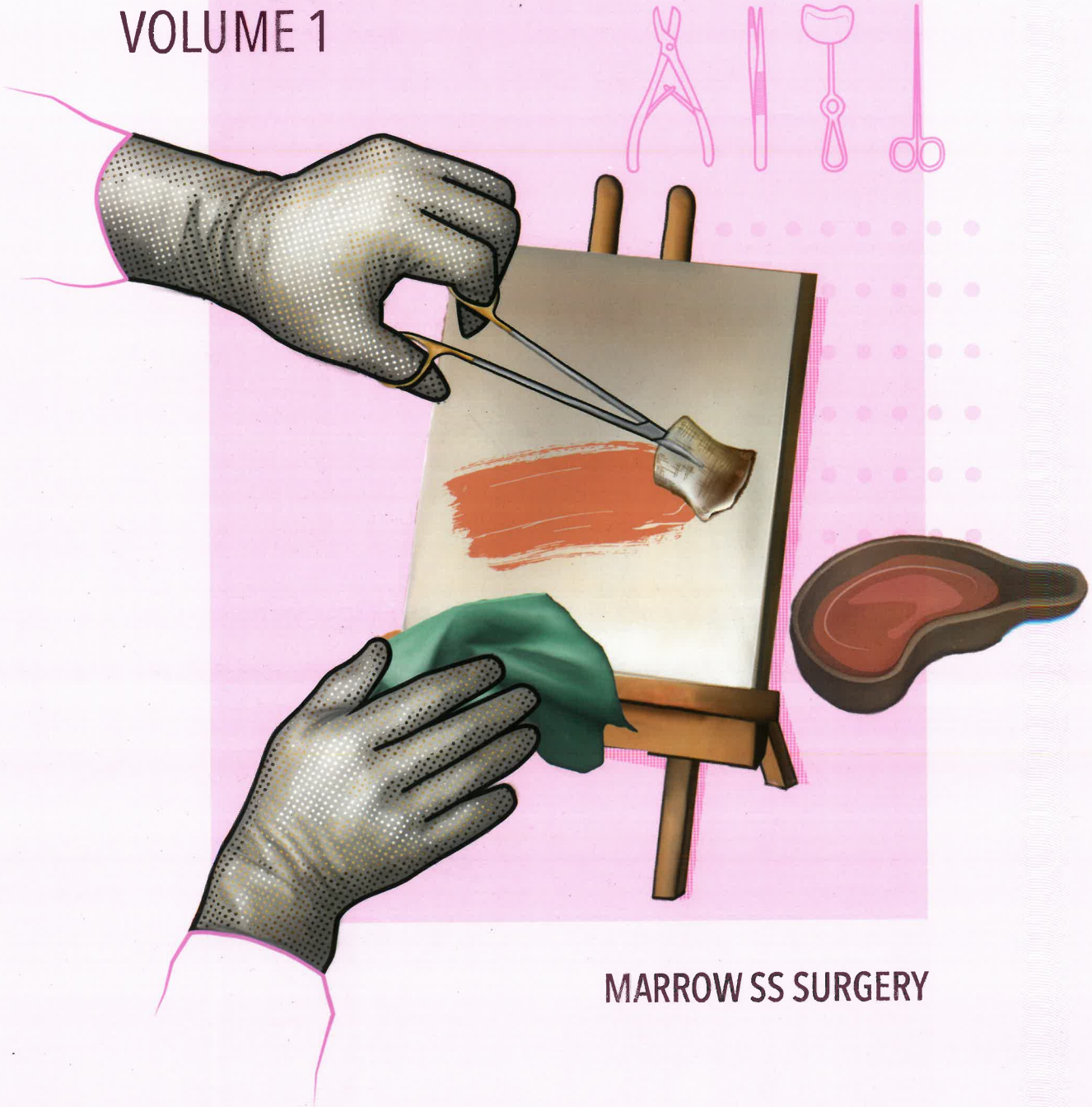
GENERAL SURGERY

VOLUME 1



MARROW SS SURGERY

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General Surgery

Volume - 1

MARROW
Super Speciality

Instructions

- The notes must be used in conjunction with the Marrow SS Surgery videos and should not be considered standalone material.

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- The notes have been consciously designed in a way that is concise and revisable. To ensure this, we have intentionally added only the most relevant modules and images that are needed for you.
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- This set contains notes of all main videos published in the app until August 2025. You can find notes for any additional videos published after this date within the app under the videos section.

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PATIENT SAFETY, OT ZONES AND SURGERY POSITIONS

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Types of events :

	Definition	Example
Adverse event	Adverse event : An incident that results in harm to the patient.	A patient who is allergic to clindamycin is given a test dose of clindamycin leading to anaphylaxis.
Near miss event	An incident that could have resulted in unwanted consequences but did not, either by chance or through a timely intervention preventing the event from reaching the patient.	Giving an epidural top up in the I.V line instead of the epidural catheter can lead to cardiotoxicity.
No-harm event	An incident that occurs and reaches the patient, but results in no injury to the patient. Harm is avoided by chance or due to mitigating circumstances.	Giving enema to the wrong patient.

Consent & IV cannula

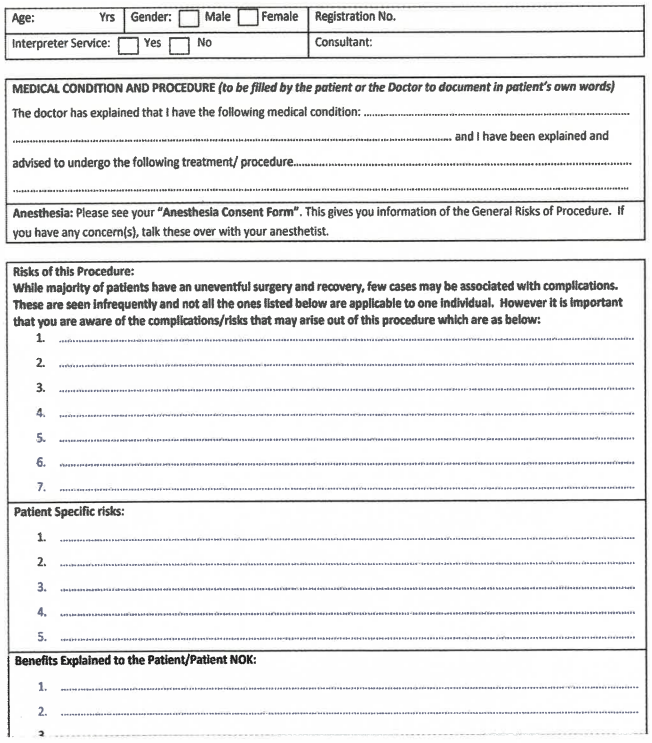
00:06:23

Consent :

Always written.

Components :

- Identification.
- Diagnosis.
- Procedure planned.
- Surgeon.
- Description of the procedure.
- Patient specific complications.
- Procedure specific complications (Only if incidence >1%).
- Benefits.
- Alternate procedures.
- Sign of patient, surgeon, witness, interpreter if patient is from a foreign country, guardian in case of a minor.



Age: Yrs	Gender: ☐ Male ☐ Female	Registration No.
Interpreter Service: ☐ Yes ☐ No		Consultant:

MEDICAL CONDITION AND PROCEDURE ***(to be filled by the patient or the Doctor to document in patient's own words)***

The doctor has explained that I have the following medical condition: .....

..... and I have been explained and advised to undergo the following treatment/ procedure.....

.....

Anesthesia: Please see your **"Anesthesia Consent Form"**. This gives you information of the General Risks of Procedure. If you have any concern(s), talk these over with your anesthetist.

Risks of this Procedure:
While majority of patients have an uneventful surgery and recovery, few cases may be associated with complications. These are seen infrequently and not all the ones listed below are applicable to one individual. However it is important that you are aware of the complications/risks that may arise out of this procedure which are as below:

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....
7. .....

Patient Specific risks:

1. .....
2. .....
3. .....
4. .....
5. .....

Benefits Explained to the Patient/Patient NOK:

1. .....
2. .....
3. .....

Consent form

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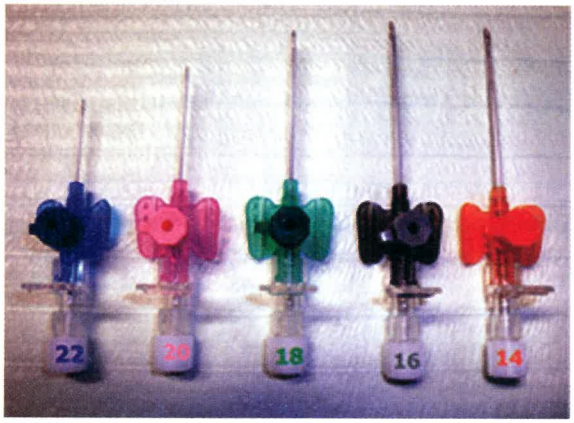
IV cannula :

Gauge	Color	max. flow rate (mL/min)
14 (Widest)	Orange	270
16	Grey	236
18	Green	103
20	Pink	67
22	Blue	31
24 (Narrowest)	Violet	13



IV cannula

- Hypotensive patient : Widest bore cannula is used to achieve the fastest flow rate.
- Burns patient : Wide bore and long cannula (To prevent slipping of cannula d/t edema).

Superficial thrombophlebitis

- m/c complication of IV line insertion.
- Cord like structure can be felt.

Surgical safety checklist

00:19:50

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Dramatic decrease in the mortality of patients (From 1.9% to 0.2 %).

Major components :

Sign in :

- Patient is shifted into the OT from the ward.
- The staff who receives the patient will do the sign in.
- Aspects to confirm :
  - Identity.
  - Registration number.
  - Diagnosis.
  - Procedure planned.
  - Site marking with non-erasable ink.
  - Allergies.

Time out :

- Before induction of anaesthesia/incision.
- When the circulating nurse declares timeout, everyone introduces themselves to each other.
- Components :
  - Recheck the identity.
  - Surgeon : Diagnosis, procedure planned and time required to carry out the procedure, expected blood loss during the surgery.
  - Anaesthetist : ASA grade and risk factors (DM,HTN) of the patient, confirmation of time of prophylactic antibiotic administration (30 min to 1 hour before surgery).
  - Scrub nurse : Confirm sterility and make sure all the equipments for the procedure are in place.

Sign out :

- At the time of skin closure.
- Components :
  - Surgeon : Confirms the actual surgery performed, any expected complications or any equipment issue faced during the surgery.
  - Nurse : Gauze, mop, needle and equipment count. If a specimen is removed the nurse has to assure that it is been labelled.
  - Anaesthetist : Blood loss and expected risks complications.

Calculation of blood loss in the theatre :

- Soaked mop : 100cc (Blue/radiopaque lines on the mop help to identify them if left behind).
- Blood in the suction – Irrigation fluid used.
- 1 fist full of clots : 500cc.

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Patient Name :	Procedure :	Date :
Notes :		
Before induction of anesthesia	Before skin incision	Before patient leaves operating room
SIGN IN	TIME OUT	SIGN OUT
• Patient confirmed • Identity • Procedure • Site marked • Anesthesia safety check completed • Pulse oximeter on patient functioning Does patient have a known allergy? • NO Difficult airway?aspiration risk? • NO Risk of >500ml bood loss (7ml/kg in children) • NO	• Confirm all team members have introduced themselves by name and role • Surgeon Anesthesia Professional and Nurse verbally confirm • Patient Anticipated critical events : • Surgeon reviews : What are the critical or unexpected steps, operative duration, anticipated blood loss? • Anesthesia team reviews : Ar there any patient specific concerns? • Nursing team reviews : Has sterility (including indicator results) been confirmed? Are there equipment issue or any concerns? Has antibiotic Prophylaxis been given within the last 60 minutes? • YES Is essential imaging displayed? • YES	Nurse verbally confirms with the team : • The name of the procedure recorded • That instrument, sponge, and needle counts are correct (or not apllicable) • How the specimen is labelled (including patient name) • Whether there are any equipment problems to be addressed • Surgeon, Anesthesia Professional and Nurse roview the key concerns for recovery and management of of this patient

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OT zones :

Protective Zone :

- Changing rooms : Changed into the scrubs.
- Transfer bay.
- Pre-op and Post-op rooms.
- ICU/PACU.

Clean zone :

- Corridor that connects the protective zone to the aseptic zone.
- Equipment storage room.
- Maintenance workshop.

Aseptic zone : OT.

Disposal zone : Waste is disposed here.

OT positions

00:39:21

Supine position

Lithotomy

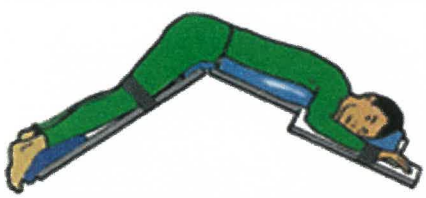
Trendelenberg position

Lateral or Kidney position

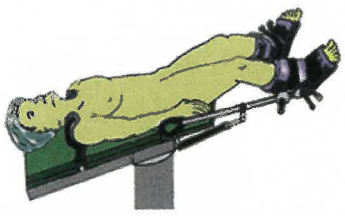
Prone position

Reverse Trendelenberg position

Sitting/Fowler's position



Jacknife position



Lloyd Davies position

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Position	Description	Indications	Remarks
Supine	Head end and the foot at the same level.	Abdominal and breast surgeries	m/c position
Trendelenberg	Head end is low and the foot end is raised.	Pelvic surgeries	To prevent the bowel from falling in to the pelvis
Reverse Trendelenberg	Head end is raised and foot end is low.	• Upper abdominal procedures • Laparoscopic cholecystectomy, • Laparoscopic sleeve gastrectomy	Bowel falls into the pelvis making space in the upper abdomen
Lithotomy	Legs are supported on stirrups and adequate padding is done to prevent nerve compression.	• Obstetric surgeries. • Gynaecology procedures. • Urogenital procedures : TURP, cystoscopy. • Piles, fissures.	Inadequate padding : Common peroneal nerve injury
Lateral/Kidney	Patient tilted towards one side and a towel roll kept below the legs with support to keep the patient in place	• Thoracotomy. • Latissimus dorsi flap for breast reconstruction. • Pyelolithotomy. • Nephrolithotomy. • Nephrectomy.	Over abduction of the arm : Brachial plexus injury.
Prone	-	• Spinal surgery • Pilonidal sinus (Jeep drivers disease)	-
Sitting/Fowler's	-	• CNS fossa (posterior fossa). • Breast reconstruction surgery.	• Advantage : Good exposure, relatively blood less field because of gravity. • Disadvantage : Air embolism risk d/t negative pressure in veins (Prevention : Ligating the veins before cutting them + saline irrigation).
Rose	Towel kept below the shoulder blades for maximum extension of neck and more exposure.	Thyroid surgery	30° head up : Less venous congestion.
JackKnife	Patient in knee elbow position.	Haemorrhoids, fissure surgery	Chest compression leading to impaired ventilation leading to positional asphyxia
Lloyd Davies	Combination of Trendelenburg and lithotomy	Rectal and anal canal surgeries	-

SURGICAL BLADES AND ENERGY SOURCES

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Surgical blades

00:00:26

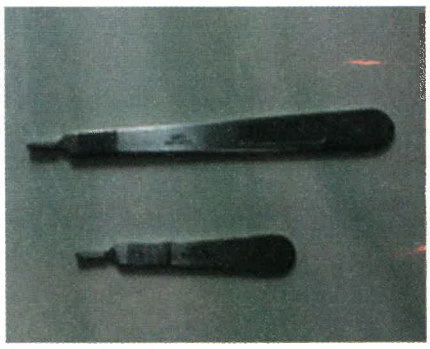
Blades :

- No. 11 Pointed/Stab blade :
  - Used for incision and drainage.
  - Also used for arteriotomy.
- No. 12 curved blade : For suture removal.
- No. 10, 15, 20, 21, 22, 23 :
  - These blades have a belly which is the curved & sharpest portion of the blade.
  - Used to make incisions.

Scalpel blade sizes and shapes

Bard Parkers Handle :

- Correct way of holding the blade : Hold it like a pen or to palm it.
- Always use a mosquito forceps to hold the blade while mounting it on the BP handle.



Bard Parkers handle

Passing sharp objects in OT :

- Ideal : Kidney tray.
- Not available : Pass the needle with the pointed end towards you.

Making an incision :

Direction of blade :

- Blade perpendicular to skin, otherwise there will be undermined/bevelled edges.
- Far to near direction.
- Opposite side to same side.

----- Active space -----

Factors while planning an incision :

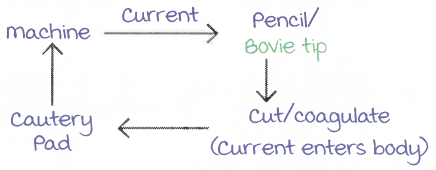
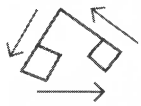
- Skin tension lines (Langer's lines) represent orientation of dermal collagen fibres and incisions made parallel to them heal better.
- Anatomical structures : Must be careful not to injure surrounding neurovascular structures.
- Cosmetic factors.
- Adequate access.

Energy sources

00:10:00

m/c used energy source : Cautery.

Types :

Monopolar cautery	Bipolar cautery
Resembles a pen	Resembles a prong
Used for cutting and coagulation : • Yellow button : Cutting • Blue button : Coagulation	Only coagulation
Principle :  	Principle :  Current comes from one blade (Electrode) and passes onto the other blade, thus completing circuit
Cautery pad : • Requires large area of contact • To be placed in well vascularized area with less hair	No need for cautery pad
Cannot be used in patients with cardiac pacemakers, structures with end arteries or close to neurovascular structures	No lateral spread of current : Safe for use close to vital structures, end arteries and in patients with pacemakers

a. Monopolar cautery b. Bipolar cautery

----- Active space -----

Scenarios in monopolar cautery :

1. Technician fails to attach cautery pad : Cautery will not work.
2. Small cautery pad is placed/only small area of contact : Burns at cautery pad site (D/t increased heat).
3. Spread of current through the body interferes with cardiac conduction.
   - In patients with cardiac pacemaker : Significant interference in conduction → monopolar is avoided or mode of pacemaker needs to be changed (To avoid repeated shocking of the heart by the pacemaker).
4. Pedicle or narrow base : Channeling of current occurs.
   - Cautery given at the tip of the pedicle can cause channeling of current to the base causing burns at the base.
   - Hence in surgeries where end arteries are involved like ear lobule or penile surgeries or surery, we avoid monopolar cautery.
5. Lateral spread of current in monopolar cautery : Can cause thermal damage to vital nerves and vessels → Hence avoided in :
   - Thyroid surgery (Damage to RLN, ELN).
   - Axilla (Damage to long thoracic nerve, thoracodorsal nerve).
   - CNS surgeries.
   - Parotid surgery.

Energy sources, cutting vs coagulation/fulguration :

- Cutting current :
  - Low voltage continuous current.
  - Principle : Sufficient heat to cause cell water to explode into steam.
- Coagulation :
  - High voltage alternating current.
  - Principle : Cell death by dehydration and protein denaturation.
  - Never applied to skin as it can burn the skin.
- Fulgaration mode : Voltage higher than coagulation.
- Blend mode : Both cutting & coagulation (Combination mode).

Note :

Cautery sources are the m/c cause of OT related fire.

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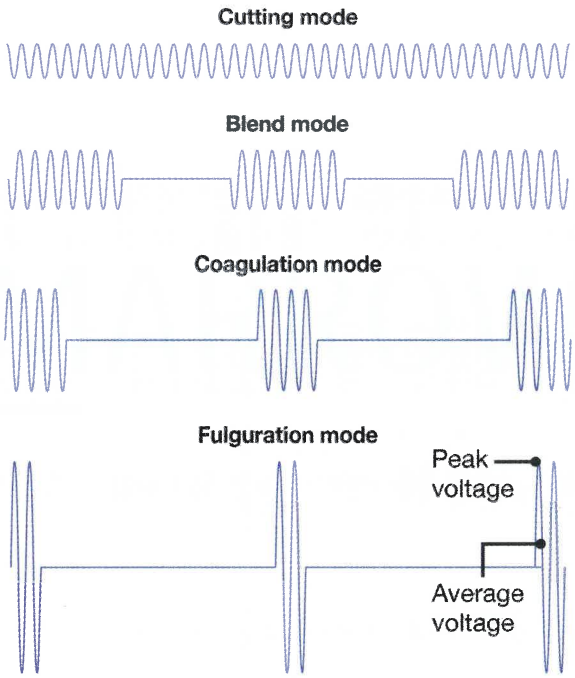
Wave forms of cautery



Ligasure :

- Uses heat + pressure to carry out coagulation.
- Can coagulate vessels upto 7 mm in diameter.
- Mechanism : Uses body's collagen and elastin to seal and divide.
- Feedback mechanism : Energy delivery is in a precise manner and results in automatic discontinuation of energy once the vessel is completely sealed, then the vessel can be cut.
- 1st generation ligasure : Only coagulation.
- 2nd generation ligasure : Coagulation followed by cutting.

Harmonic scalpel :

Features :

- Works on the ultrasonic principle.
- Oscillatory blade that oscillates b/w 20000–50000 Hz oscillations that causes protein denaturation.
- Coagulation occurs without heat production.

Harmonic scalpel

Advantages :

- Can be used close to vital structures.
- Precise cut.
- Can cut through scar tissue.
- Can coagulate vessels upto 7 mm in diameter.