

Hemostasis in surgery

„All bleeding (eventually) stops“

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Why hemostasis is important in surgery

Minimize blood loss during the operation

Avoid tranfusion

Manage increasing of anti -coagulated patients

Reduces complications after surgery

Why Hemostasis is important in surgery

Haemostasis must be achieved in all phases of the surgery.

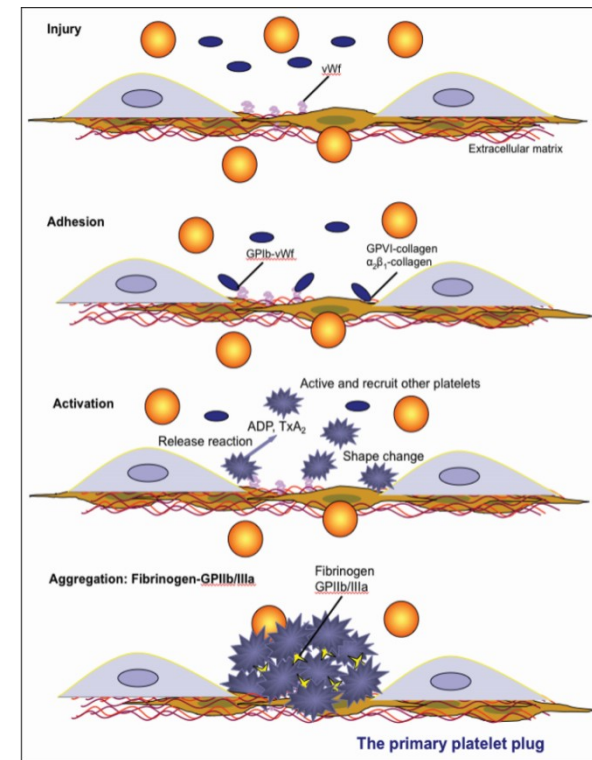
Effective management of hemostasis during **surgery** is critical for the patient

It is important to gain haemostasis in the superficial layers before proceeding to the deeper structures

Hemostasis

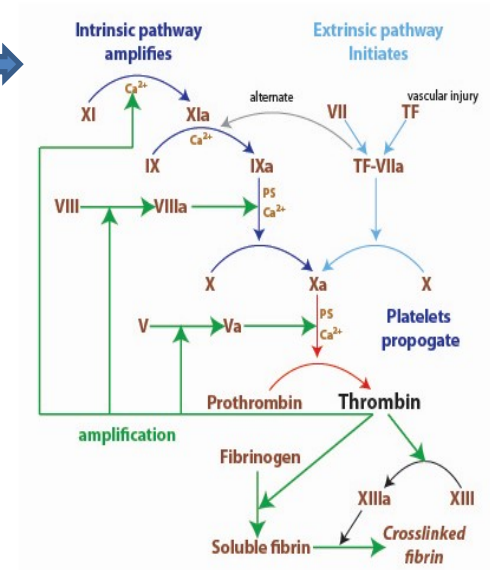
- **Primary Hemostasis** →

- Vasoconstriction
- Formation of platelet plug



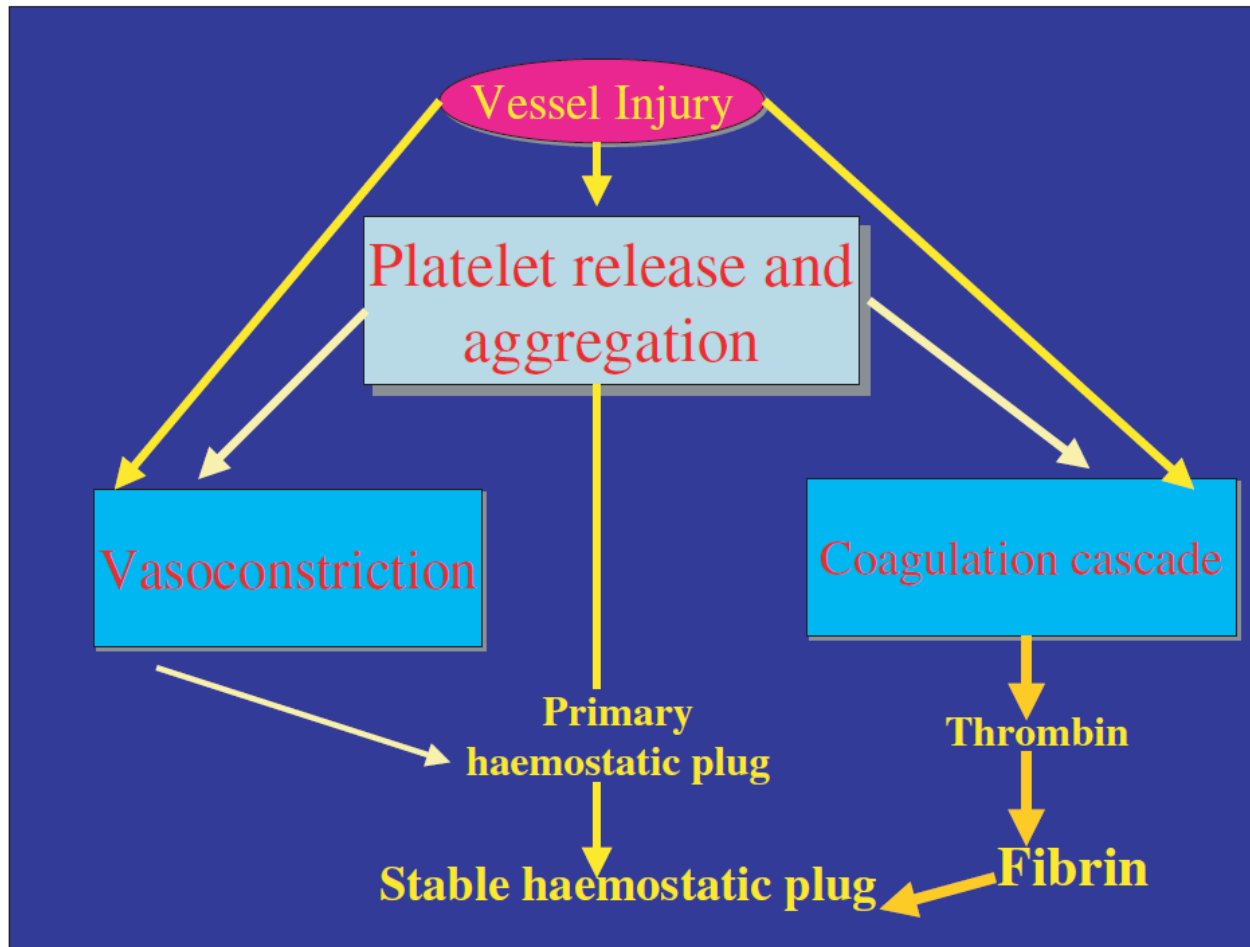
- **Secondary Hemostasis** →

- Activation of coagulation cascade
- Formation of permanent plug



Pathophysiological Aspects of Coagulation

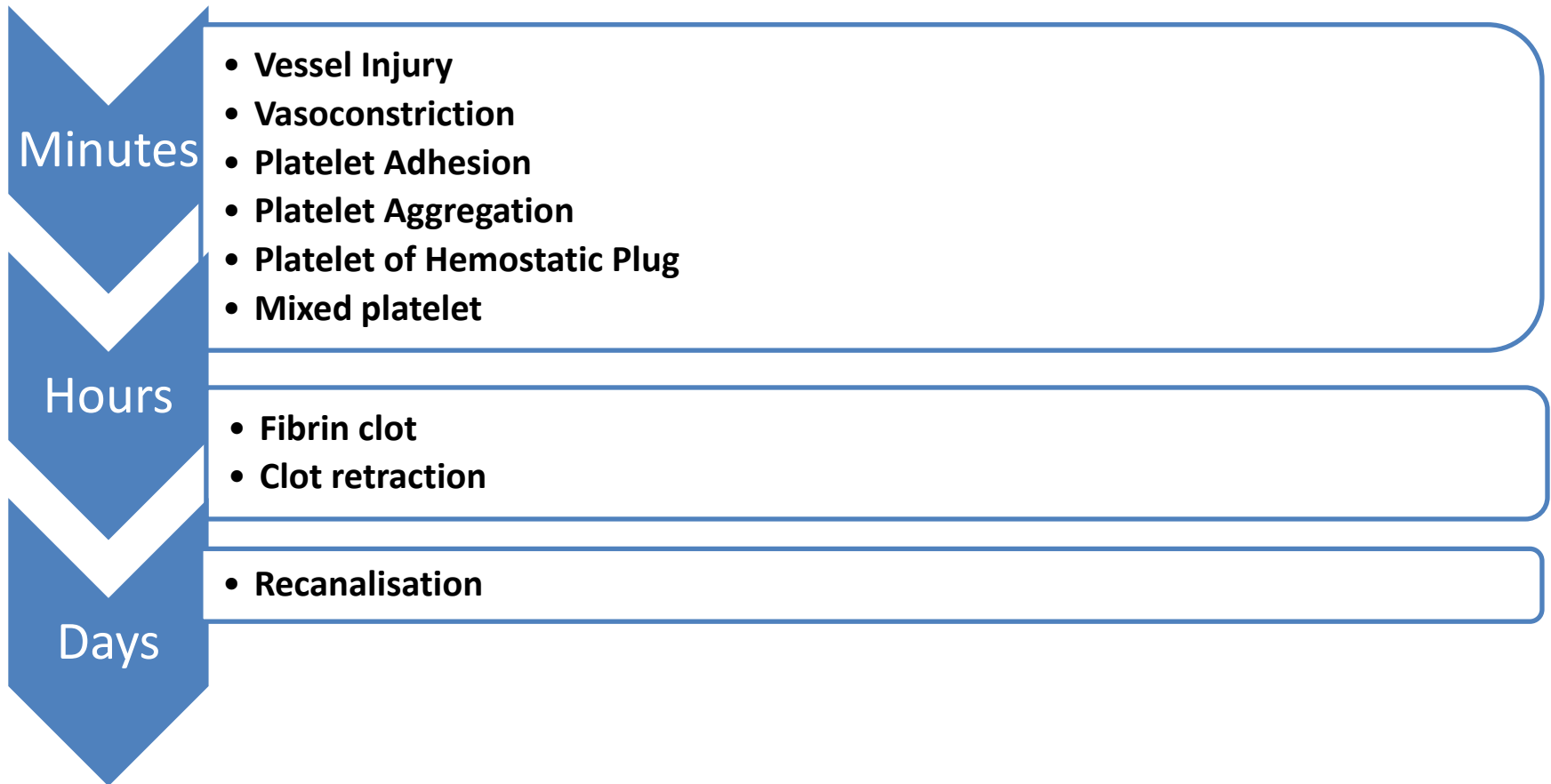
Scheme of primary haemostatic function



Platelet Granule Content and Their Biological Functions

Location	Compound	Function
Alpha granule	Platelet factor 4	Neutralises heparin effect
	α -thromboglobulin	Promotes fibroblast chemotaxis
	Platelet-derived growth factor	Mitogen for fibroblast; chemotaxis for neutrophils, fibroblasts, and smooth muscle
	von Willebrand factor	Adhesion molecule; carrier for factor VIII, protecting it from proteolysis
Dense granule	Thrombospondin	Promotes platelet-platelet interaction
	Fibronectin	Adhesion of platelets and fibroblasts
	ADP	Aggregation of platelets
	ATP	Source of ATP for energy
	Serotonin	Vasoconstriction
	Calcium	Coagulation; platelet function

Hemostasis



Methods of hemostasis

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graph TD; A[Methods of hemostasis] --> B[Mechanical]; A --> C[Cauterization]; A --> D[Chemical Vasoconstrictor]; B --- E[Press, ligation-- etc]; D --- F[Topical absorbable];
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Mechanical

Press, ligation-- etc

Cauterization

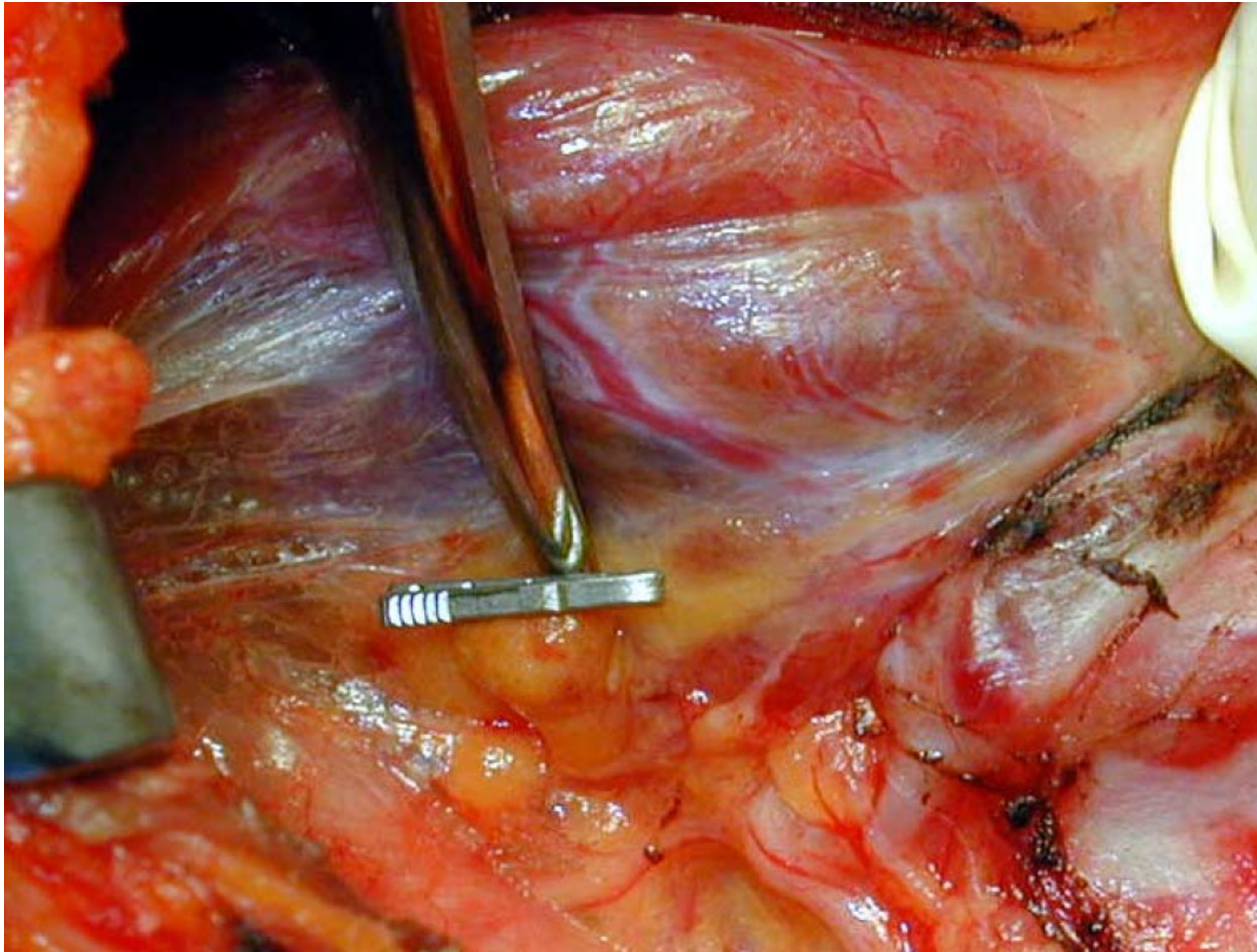
**Chemical
Vasoconstrictor**

Topical absorbable

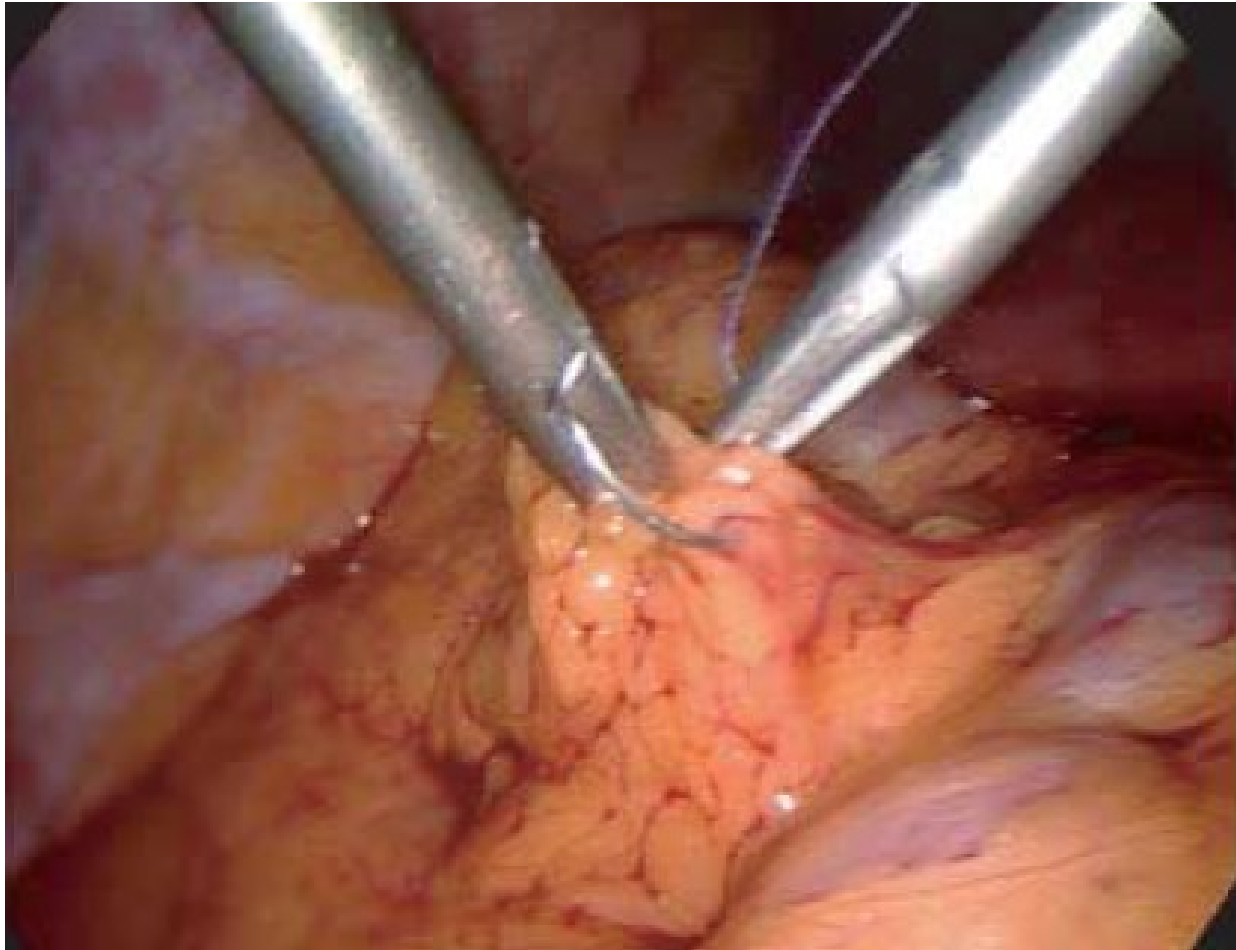
Mechanical Methods of haemostasis

- Direct pressure
- Clamps
- Ligation Clips
- Sutures
- Staples
- Bone Wax
- External bandages

Ligaclip



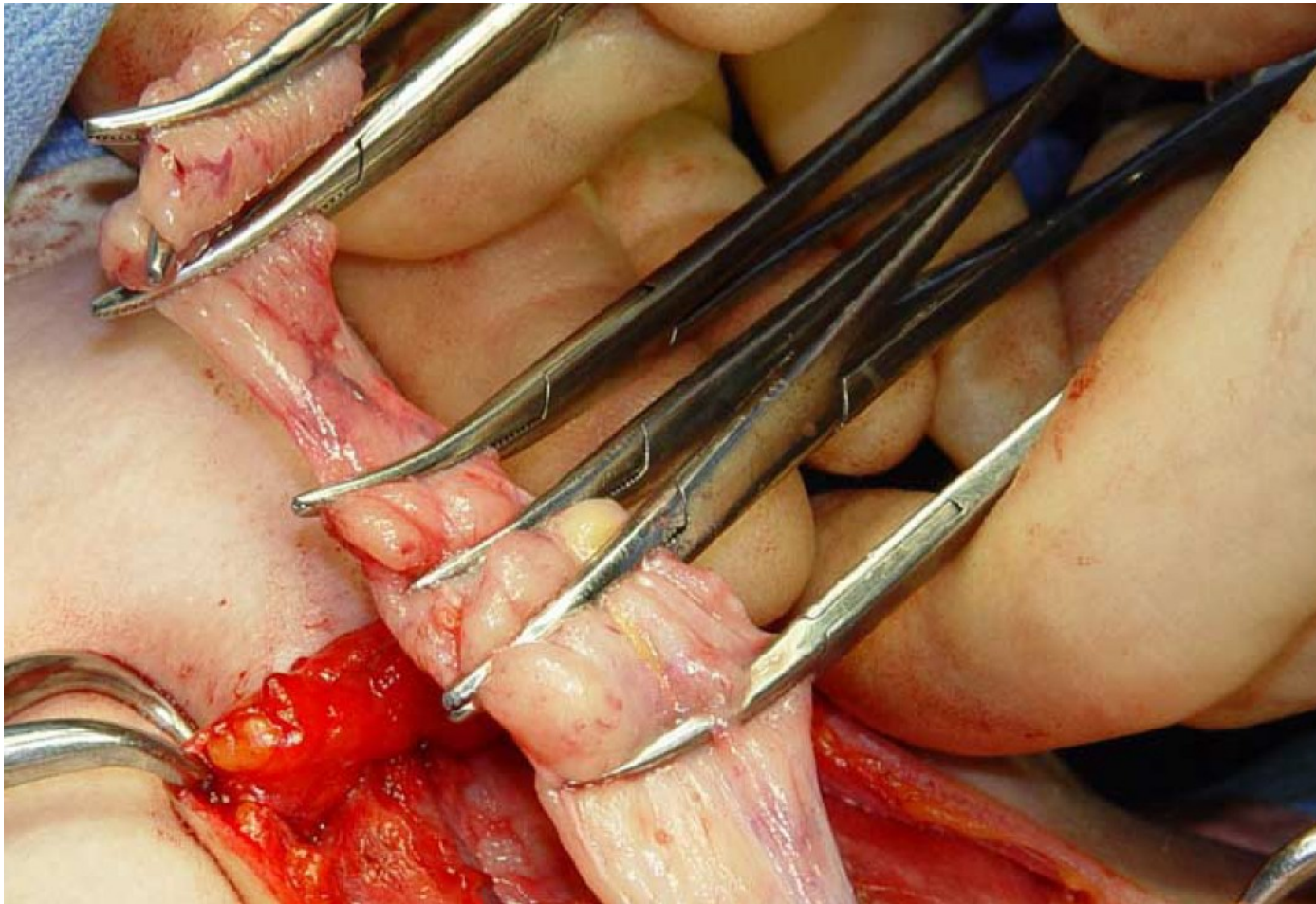
Suture ligation during laparoscopic surgery



Application of laparoscopic clips



Excision of the thymus



Cauterization Methods of haemostasis

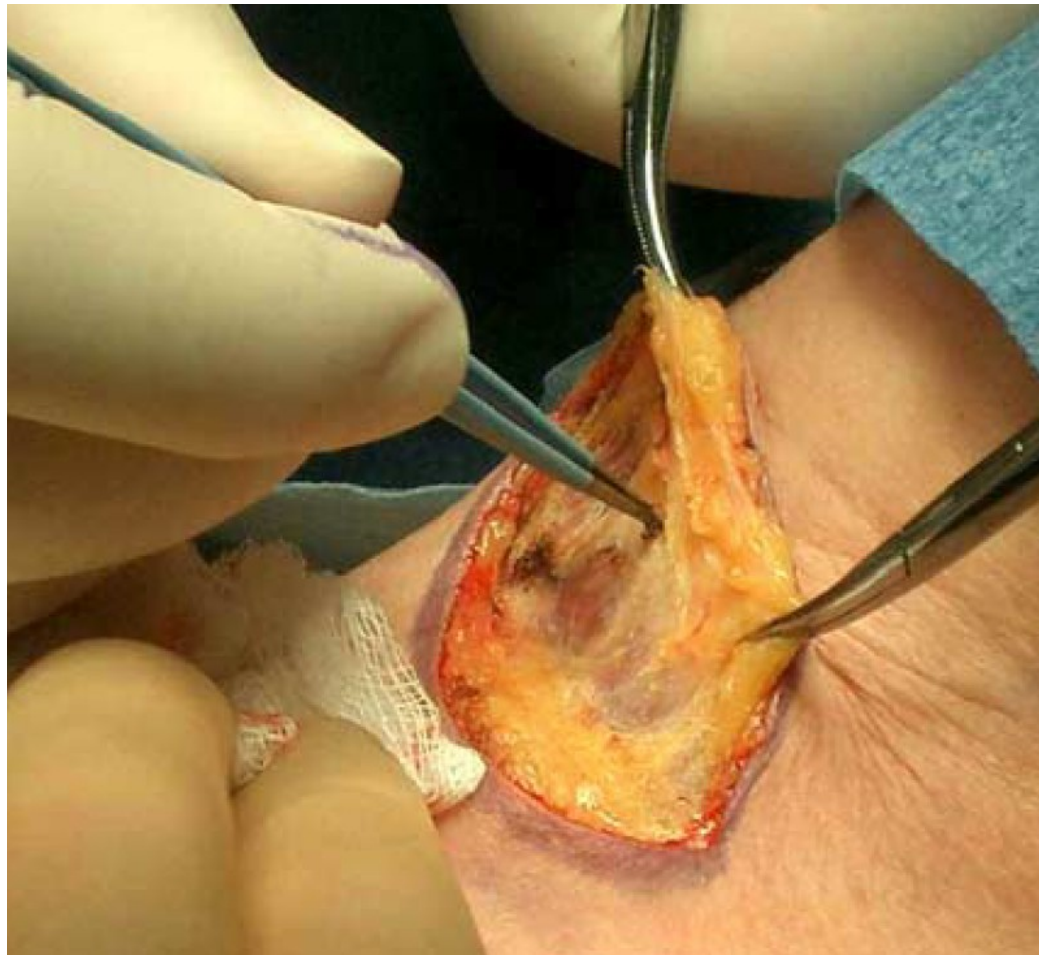
Thermal Cautry

- Harmonic Scalpel
- Laser
- Cryosugery

Electrocautry

- Monopolar
- Bipolar
- RF

Raising of superior skin flap with monopolar diathermy forceps



Bipolar coagulation

- **Bipolar coagulation** is fundamental to neurosurgery because it enables precise coagulation of small vessels without dangerous spread of the current to adjacent neural and vascular structures.
 - A range of bipolar forceps of different sizes and lengths should be available

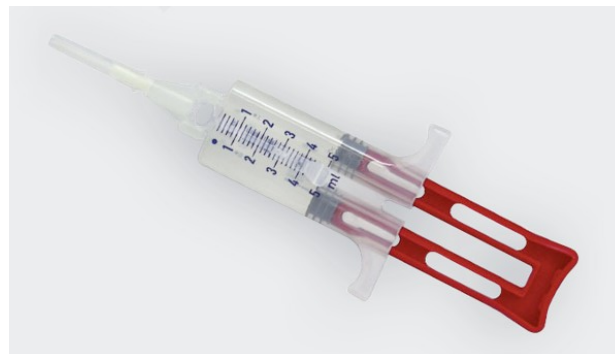
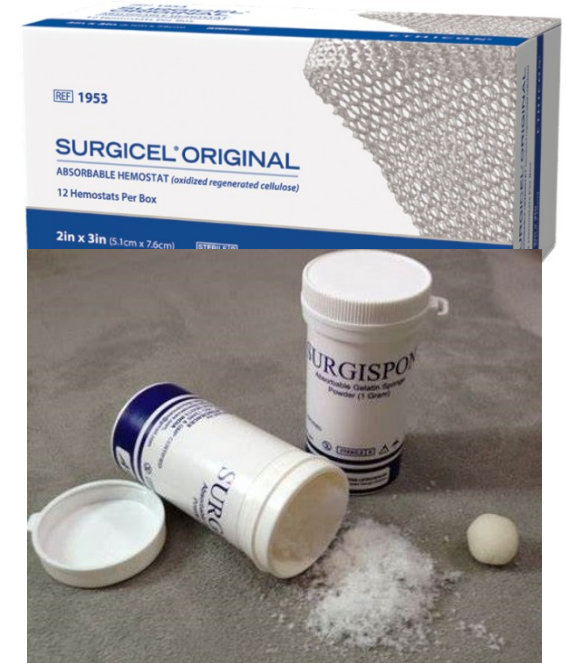
Liga-Sure and application of Liga-Sure.



Chemical Methods of haemostasis

Topical absorbable

- Oxidized Regenerated Cellulose
- Gelatin Sponge or Powder
- Collagen
- Thrombin
- Fibrin Glue



Surgical Blood Loss

Potential negative outcome of intra- operative blood loss

- Anemia
- Hypovolemia

Potential negative outcomes of blood transfusion

- Increased post op infection rates
- Allergic and hemodynamic transfusion reaction
- Viral transmission