ΑΙΜΟΡΡΑΓΙΑ κατά τις χειρουργικές παρασκευές στην κοιλιά και στην πύελο: **Επιλογές** και τεχνικά βήματα της **αντιμετώπισής** της

ΜΑΝΕΣ ΚΩΝΣΤΑΝΤΙΝΟΣ

Γεν. Χειρουργός

Επιμελητής Α`

Χειρουργική Κλινική

«ΚΩΝΣΤΑΝΤΟΠΟΥΛΕΙΟ»

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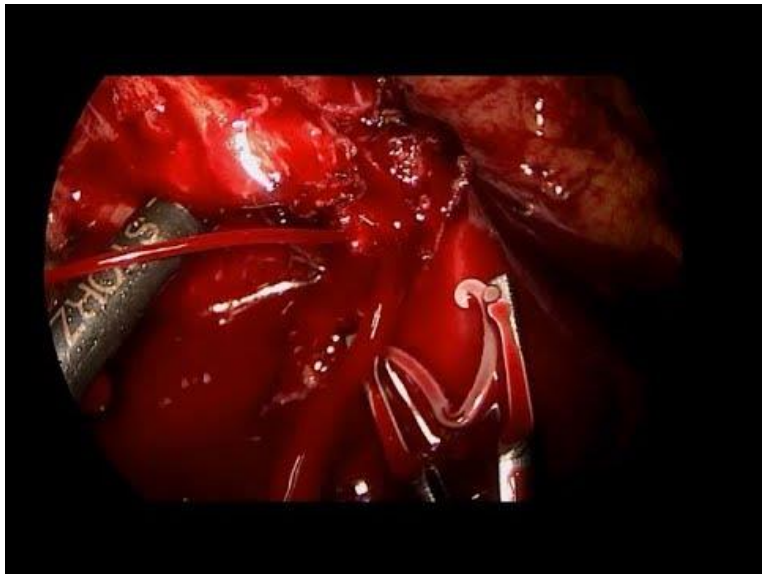


1ο Πανελλήνιο Συνέδριο Κολοπρωκτολογίας

Τεκμηριωμένη γνώση - εξατομικευμένη προσέγγιση

23-25 Ιανουαρίου 2020 Αθήνα

ΑΙΜΟΡΡΑΓΙΑ κατά τις χειρουργικές παρασκευές στην κοιλιά και στην πύελο: **Επιλογές** και τεχνικά βήματα της **αντιμετώπισής** της

Hemorrhage is the No1 killer in the operating room all over the world.

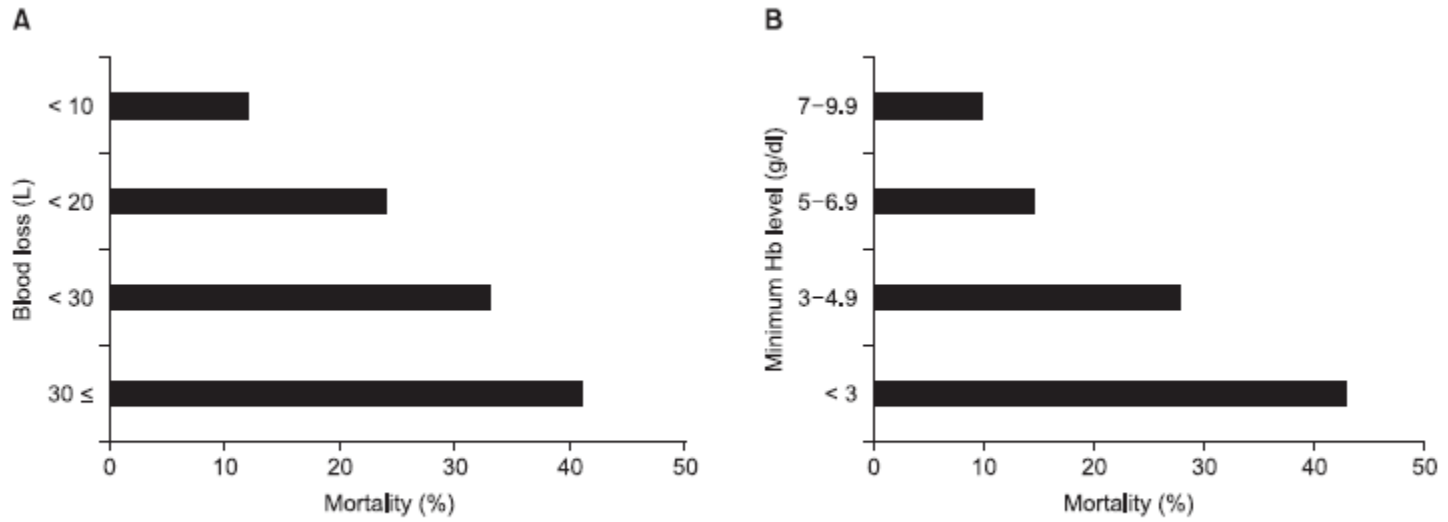


Fig. 2. Outcome of 1,257 patients whose intraoperative blood loss exceeded 5,000 ml in terms of the function of blood loss (A) and the minimum intraoperative hemoglobin level (B).

Kirchoff. *Ann Surg 2008*

ΑΙΜΟΡΡΑΓΙΑ κατά τις χειρουργικές παρασκευές στην κοιλιά και στην πύελο: **Επιλογές** και τεχνικά βήματα της **αντιμετώπισής** της

- blood transfusion = **independent risk factor** for intra- and postoperative complications in colorectal surgery

Kirchoff. *Ann Surg 2008*

- Definition???
- Frequency???

The Clavien-Dindo classification of surgical complications.
Ann Surg 2009

ΑΙΜΟΡΡΑΓΙΑ κατά τις χειρουργικές παρασκευές στην κοιλιά και στην πύελο: **Επιλογές** και τεχνικά βήματα της **αντιμετώπισής** της

Causes of non-vascular sources of perioperative bleeding are :

- preexisting undetected bleeding disorder,
- the nature of the operation itself, or
- acquired coagulation abnormalities secondary to haemorrhage, haemodilution, or haemostatic factor consumption.

Ghadimi. 2016

Prevention and management of hemorrhage during colorectal surgery

Main causes of intraoperative hemorrhage :

- (I) inadequate knowledge of the anatomical courses of the vessels
- (II) poor identification of anatomic layers
- (III) lack of correct and effective traction and effective exposure of visual field and
- (IV) lack of cooperation among skillful team members.

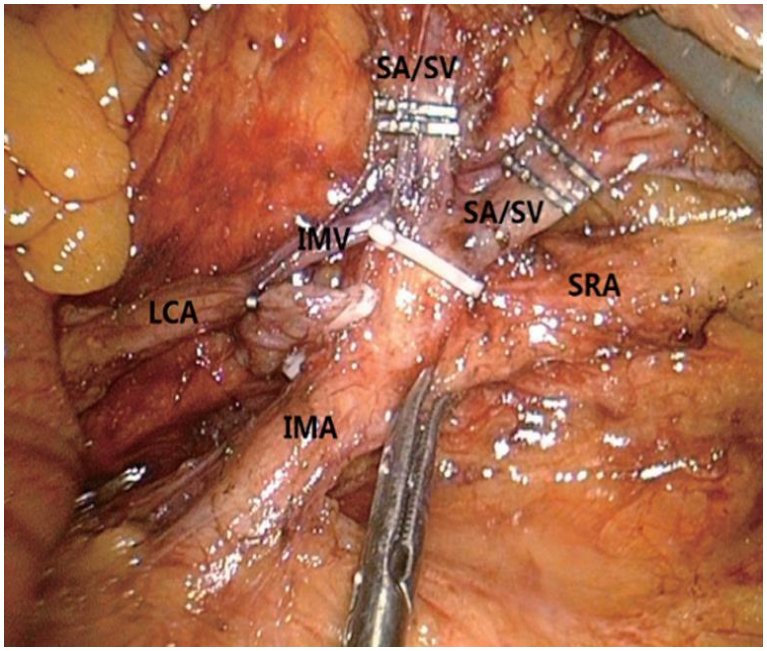
Zhang. *Ann Laparosc Endosc 2016*

Prevention and management of hemorrhage during colorectal surgery

- ***Identifying the appropriate anatomical landmarks***

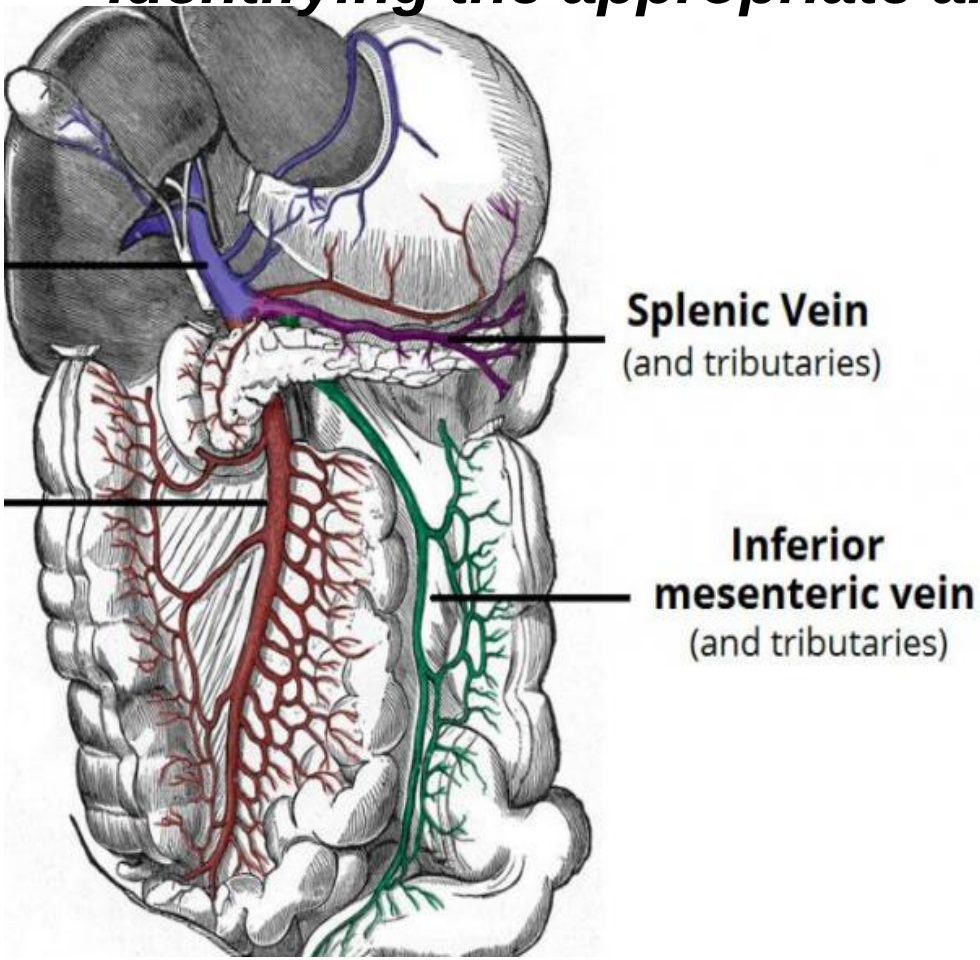
Surgeries in <u>rectum or left colon</u> :

- IMA
- IMV
- Lateral lig.



Prevention and management of hemorrhage during colorectal surgery

- Identifying the appropriate anatomical landmarks



- SPLENIC V. (SPLENIC FLEX.)

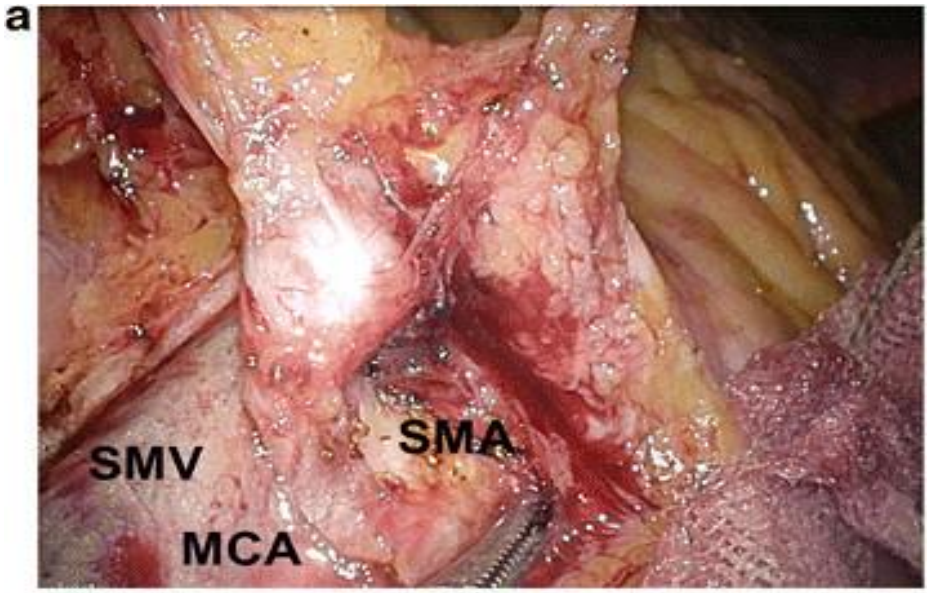
Wakeman.
Dis Colon Rectum 2008

Prevention and management of hemorrhage during colorectal surgery

- ***Identifying the appropriate anatomical landmarks***

Surgeries in <u>RIGHT colon</u> :

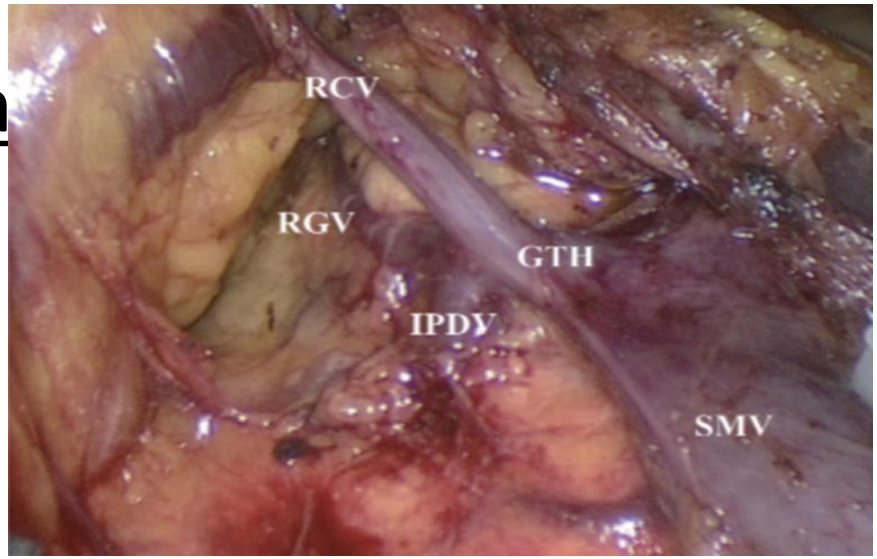
- SMA
- SMV



Prevention and management of hemorrhage during colorectal surgery

- ***Identifying the appropriate anatomical landmarks***

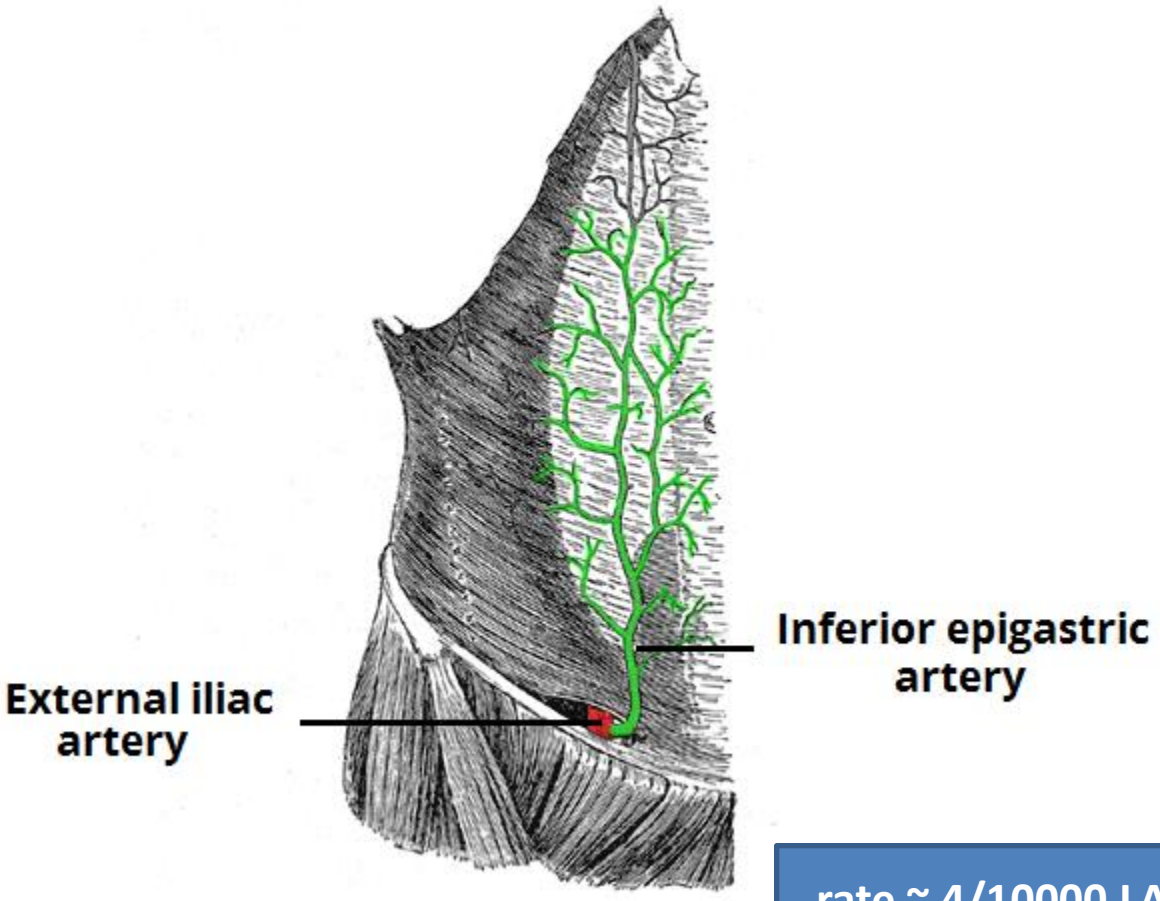
Surgeries in <u>RIGHT colon</u>



- Gastrocolic trunk

the typical 3-branch type (right colic vein, right gastroepiploic vein, and anterior superior pancreaticoduodenal vein), 2-branch type,

Prevention and management of hemorrhage during *LAP* colorectal surgery



rate ~ 4/10000 LAP Colectomies

Prevention and management of hemorrhage during colorectal surgery

- ***Entering the correct anatomical layers***

COLON Surgery

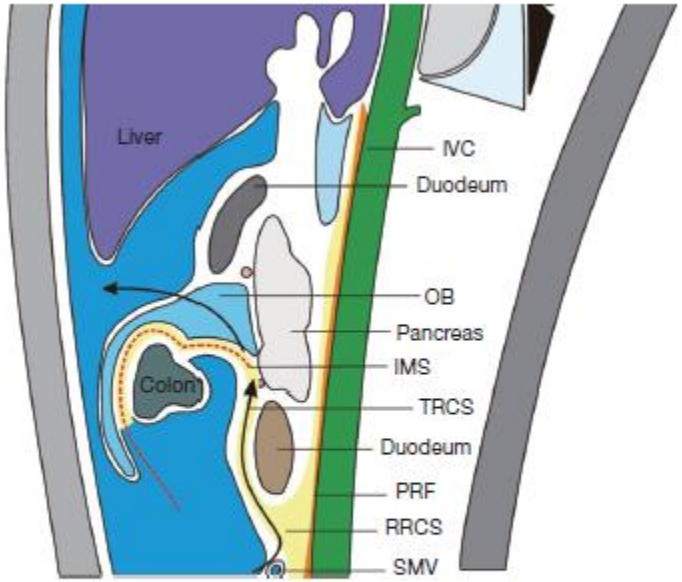


Figure 4 Schematic diagram of the anatomic layers during a colon surgery. RRCS, right retrocolic space; TRCS, transverse retrocolic space; IMS, intermensentric space; PRF, prerenal fascia; RPS, retroperitoneal space; EPS, extraperitoneal space.

Prevention and management of hemorrhage during colorectal surgery

- ***Entering the correct anatomical layers***

Rectal Surgery

incorrect mobilisation of the posterior rectum outside the Waldeyer's fascia can tear out the lower PV plexus or the sacral basivertebral veins

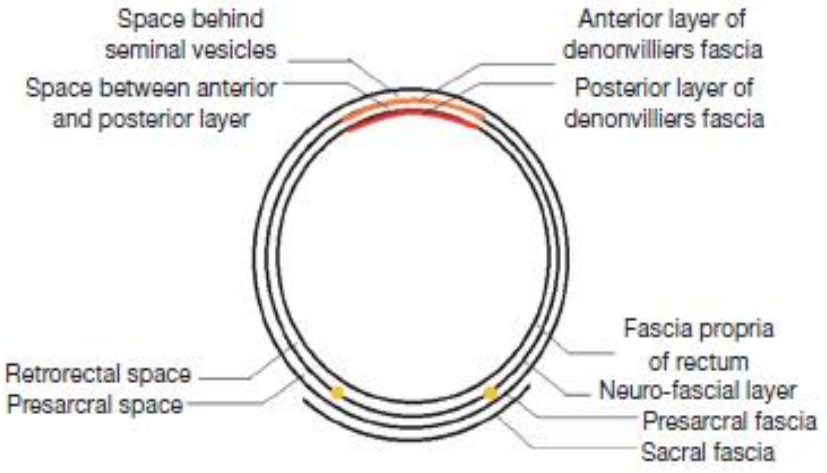


Figure 3 Schematic diagram of the anatomic layers during a rectal surgery.

Prevention and treatment of **anastomotic** bleeding

- intraoperative endoscopic hemostasis using titanium clips or electrocautery
- suturing under direct vision for bleeding in the ultra-low anastomoses

Zhang. *Ann Laparosc Endosc 2016*

Management of hemorrhage during colon surgery

- Most of injuries can be repaired by :

  primary suture or **end-to-end anastomosis**.

- Few injuries need interposition grafts, patch venoplasty or venous ligation.

  (Need for vascular surgeon)

OKTAR. *Surg Today 2007*

Catastrophic intraoperative hemorrhage: 5-step action plan

STEP 1

- **Like the Boy Scouts, be prepared**

- patient`s history
- predisposing factors

- Platelets > 50000
- Alcohol
- Obesity
- DRUGS : aspirin, NSAIs

- *3 INADEQUACIES:*

1. **Inadequate incision**
2. **Inadequate retraction**
3. “” anesthesia

Catastrophic intraoperative hemorrhage: 5-step action plan

STEP 2

- **Follow these basic principles**

Apply immediate pressure with a finger or sponge stick

Then obtain exposure and assistance. Exposure usually means extending the incision and using a fixed table retractor.

FAST TRACK

If the bleeding source is unknown, apply pressure on the aorta using a hand, weighted speculum, or aortic compressor

Catastrophic intraoperative hemorrhage: 5-step action plan

FAST TRACK

Perform primary volume expansion before replacing blood or blood components

Then suture with a running suture

Catastrophic intraoperative hemorrhage: 5-step action plan

STEP 3
Try a topical hemostatic agent

TABLE 2
Topical intraperitoneal hemostatic agents

AGENT	WHAT IT IS	HOW IT IS APPLIED
Avitene Ultrafoam	Absorbable collagen hemostat	Comes in powder; sprinkle on area
Fibrin glue • **Coseal** • **Floseal** • **Tisseal**	Equal amounts of cryoprecipitate and thrombin	Spray on affected area with double-barrel syringe or device supplied by Baxter Healthcare
Gelfoam	Absorbable gelatin sponge	Cut in strips of appropriate size and apply to area
Surgicel	Oxidized regenerated cellulose	Cut in strips of appropriate size and apply to area

Catastrophic intraoperative hemorrhage: 5-step action plan

STEP 5

- **When all else fails: "pack and go"**

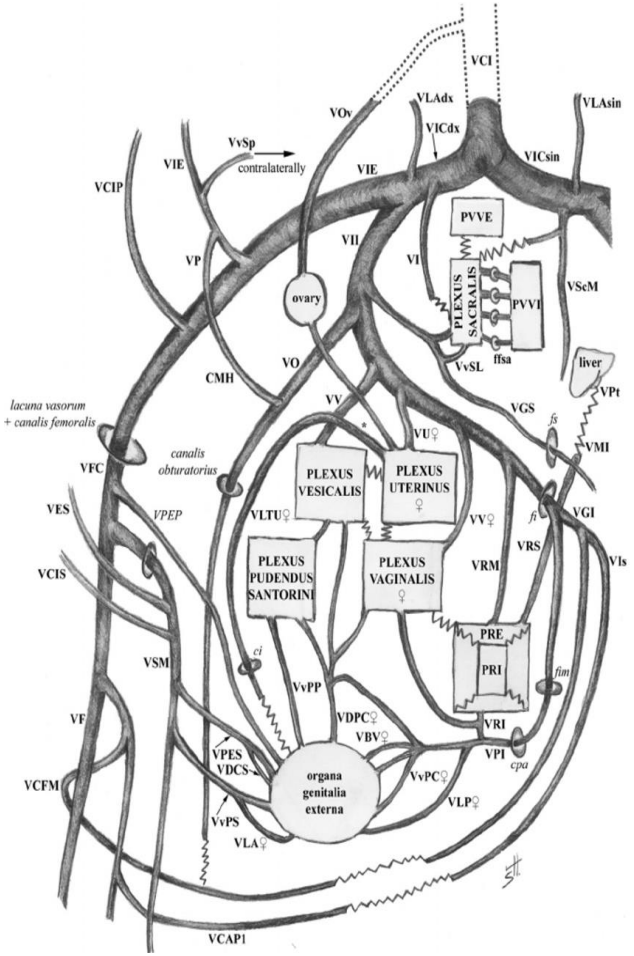
✓Packing requires reoperation for removing the packs 24–48 h later and risk of rebleeding.

✓Pelvic packing involves the implantation of a foreign material, which may increase the risk of pelvic sepsis.

Pelvic hemorrhage

Most intraoperative bleeding during pelvic cancer surgery :

1. **The presacral venous plexus**
2. **<u>internal iliac vein.</u>**



Wang 2013

Celentano. *Ann R Coll Surg Engl 2014*

Pelvic hemorrhage

- Presacral Hemorrhage : 4.6% - 9.4%

D`Ambra. *World J Surg 2009*

- Local tumor spread
- Posterior Ca/Narrow pelvis
- Irradiation
- Previous surgery

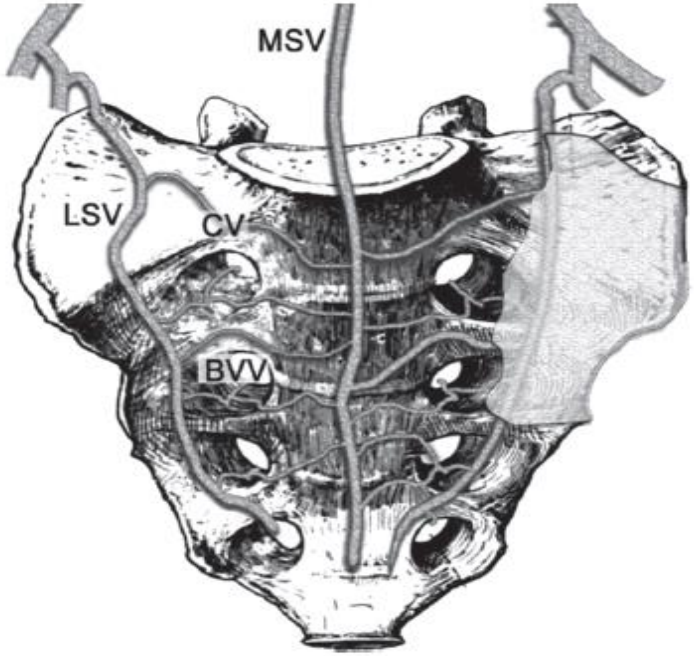
- loss of normal anatomy

- Vasodilator anesthetic drugs
- Lithotomy position

- blood pooling (>risk for hemorrhage)

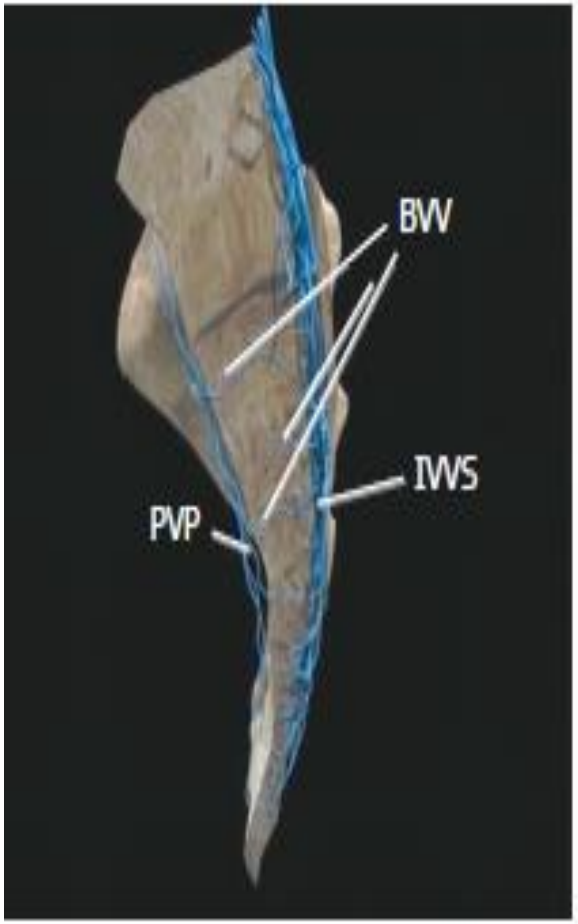
Bonello. *Tech Coloproct 2014*

Presacral Hemorrhage



MSV = middle sacral vein; LSV = lateral sacral vein;
CV = communicating vein; BVV = basivertebral vein

Figure 1 Anatomy of the presacral venous plexus: The presacral fascia, shown on the left sacral wing, has been removed. The basivertebral veins, emerging from the sacral foramina, anastomose the presacral venous plexus with the internal vertebral system.



RCS
ADVANCING SURGICAL STANDARDS

REVIEW

Ann R Coll Surg Engl 2014; **96**: 261–265
doi 10.1308/003588414X13814021679951

Surgical management of presacral bleeding

V Celentano, JR Ausobsky, P Vowden

Bradford Teaching Hospitals NHS Foundation Trust, UK

- Systematic review between 1960 and 2013.

RCS ADVANCING SURGICAL STANDARDS

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Table 1 Classification of the techniques available to control presacral bleeding

Packing techniques	
Traditional pelvic packing	Cosman
Silastic tissue expander	
Perineal Sengstaken–Blakemore tube	McCourtney
Inflatable sterile saline bag	
Breast implant sizer	Braley
Muscle tamponade	Remzi
Tacking techniques	
Metallic thumbtacks	Wang/1985
Topical haemostatic agents	
Haemostatic matrix + adsorbable haemostat	Germanos/2010
Oxidised cellulose + cyanoacrylate glue	Chen
Bone cement	
Bone wax	
Direct/indirect electrocoagulation and suture	
Muscle fragment welding	
Spray electrocautery	Fillipakis
Argon beam coagulation	Kandeel
Bipolar coagulation	Li
Circular suture ligation	Jiang

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BUT

- The PACKING techniques for patients with **APR** and a permanent stoma.

- When there is a fresh colorectal anastomosis, packing increases the risk of AL

Fazio. *Dis Col Rectum 1988*

RCS
ADVANCING SURGICAL STANDARDS

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BUT

thumbtack displacement ⟶ in:

chronic pain, ***anastomotic disruption*** and ***fistulas***.

Multiple technical difficulties such as :

- poor accessibility of the lower sacrum,
- obscured visualisation caused by bleeding,
- inability in a limited space to drive the tip of the tack and bending of the tacks.
- osteoporosis

RCS
ADVANCING SURGICAL STANDARDS

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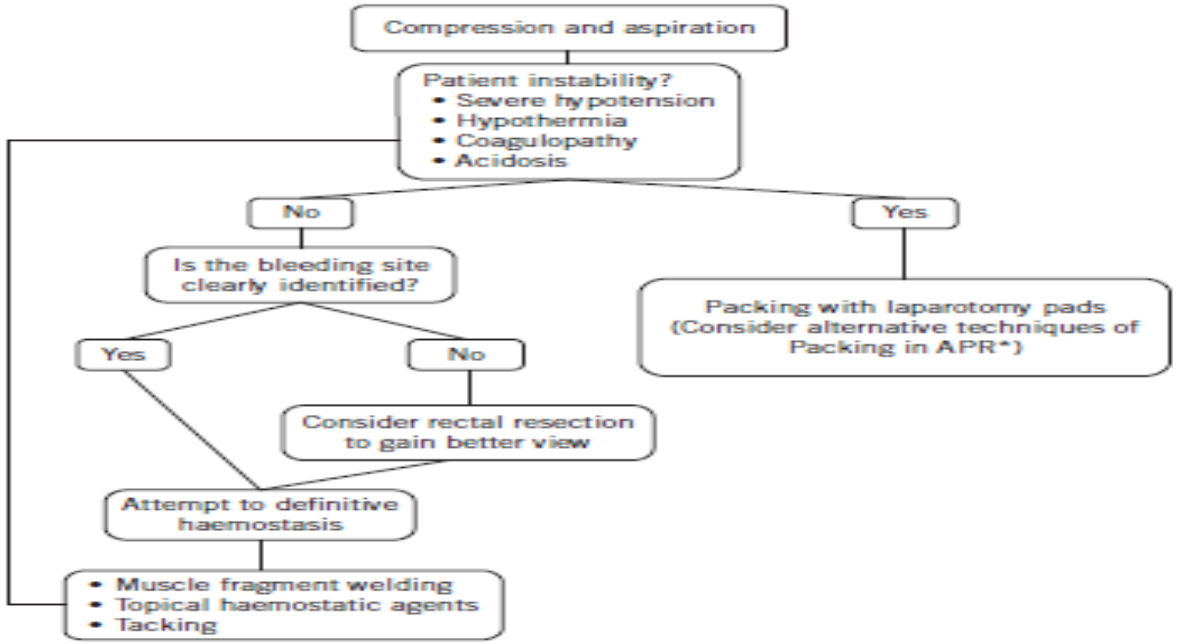

Figure 2 Algorithm for surgical management of presacral bleeding. Different techniques can be applied in a single patient sequentially.

World Journal of Gastroenterology

Submit a Manuscript: http://www.wjgnet.com/esps/
DOI: 10.3748/wjg.v23.i9.1712

World J Gastroenterol 2017 March 7; 23(9): 1712-1719
ISSN 1007-9327 (print) ISSN 2219-2840 (online)

SYSTEMATIC REVIEWS

Presacral venous bleeding during mobilization in rectal cancer

Jose Enrique Casal Núñez, Vincenzo Vigorita, Alejandro Ruano Poblador, Ana María Gay Fernández, Maria Ángeles Toscano Novella, Nieves Cáceres Alvarado, Lucinda Pérez Dominguez

- Incidence 0.25%-8.4%
- Review of 58 articles
- From 1960 till 2016

Wang *et al*[4] describe 3 types of venous injury and direct implications for their handling: injury to the presacral veins (type I), injury to the presacral veins and/or basivertebral veins of diameter < 2 mm (type II), and injury to the presacral veins and/or basivertebral veins of diameter > 2 mm (type III).

World Journal of Gastroenterology

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Table 1 Classification of techniques for the control of presacral bleeding

Pelvic plugging	
	Traditional with compresses
	Sengstaken-Blakemore tube
	Linton balloon
	Compartmental hemostatic balloon
	IV Saline Bag
	Breast implant
	Plugging with rectus abdominis muscle
	Plugging with Bonewax®
	Plugging with bone cement
	Bakri balloon
Metal implants	
	Simple pins
	Helical titanium pins + Surgicel®
	Staples + cancellous bone + Surgicel®
	Ligaclips®
Topical hemostatic agents	
	Cyanoacrylate
	Cyanoacrylate + Surgicel®
	Ankaferd Blood Stopper®
	Floseal® + Surgicel®
Direct suture	
	Infrarenal aorta clamp + PVS suture
	Suture-circular ligature
Direct/indirect electrocoagulation	
	Spray electrocautery
	Bipolar coagulation
	Argon coagulation
	Electrocoagulation on a piece of epiploic appendix/muscle fragment

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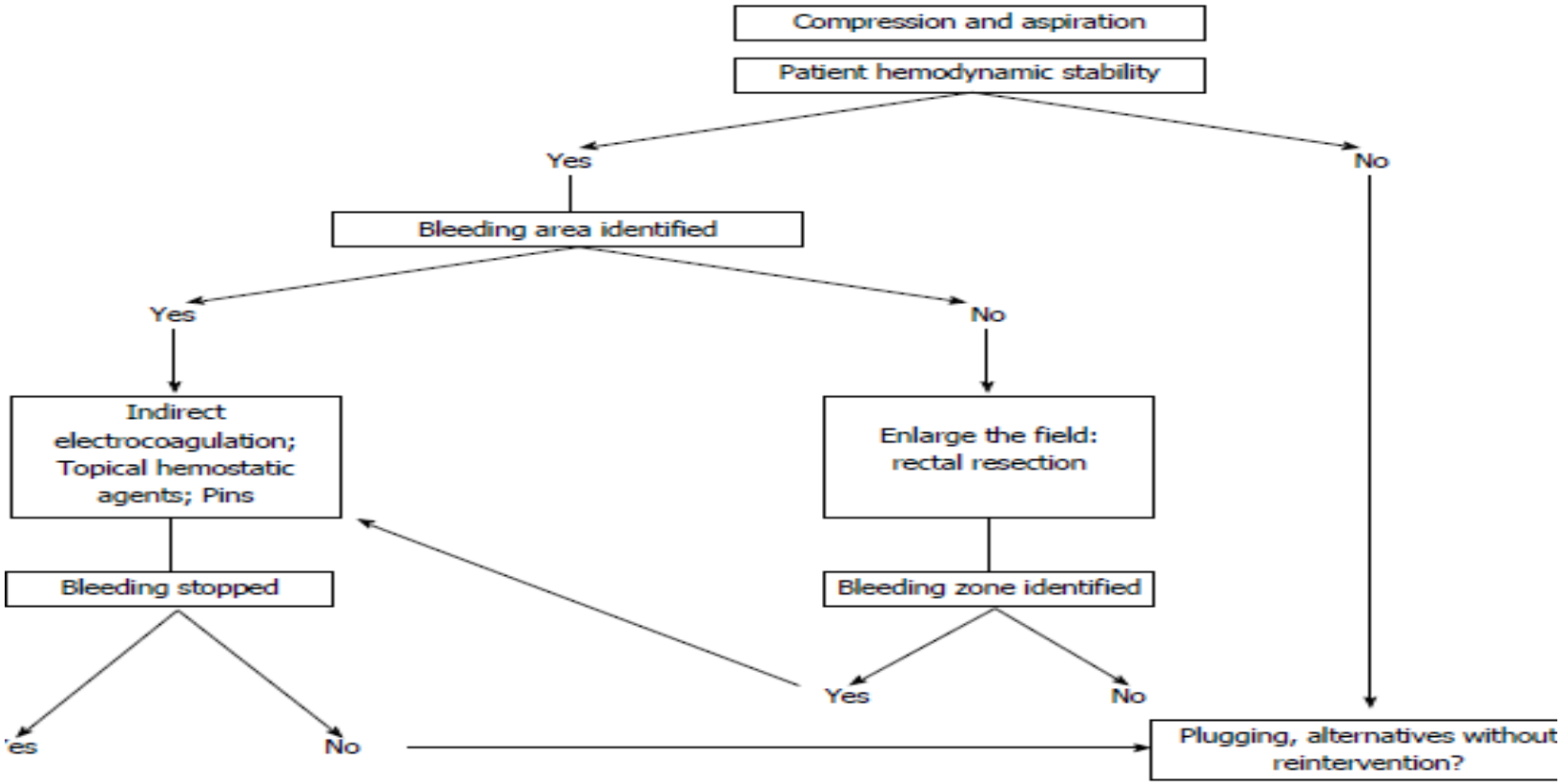


igure 3 Presacral venous hemorrhaging: treatment algorithm.

Pelvic hemorrhage

26 pts :

- 11 pelvic exenterations,
- 3 ELAPERs,
- 1 recurrent AR,
- 5 APRs and
- 6 ultra-low AR.

The median intraoperative blood loss 1,250 ml
53.8 % of the patients sustaining a loss ≥1,000 ml.

Bonello. *Tech Coloproct 2014*

Pelvic hemorrhage

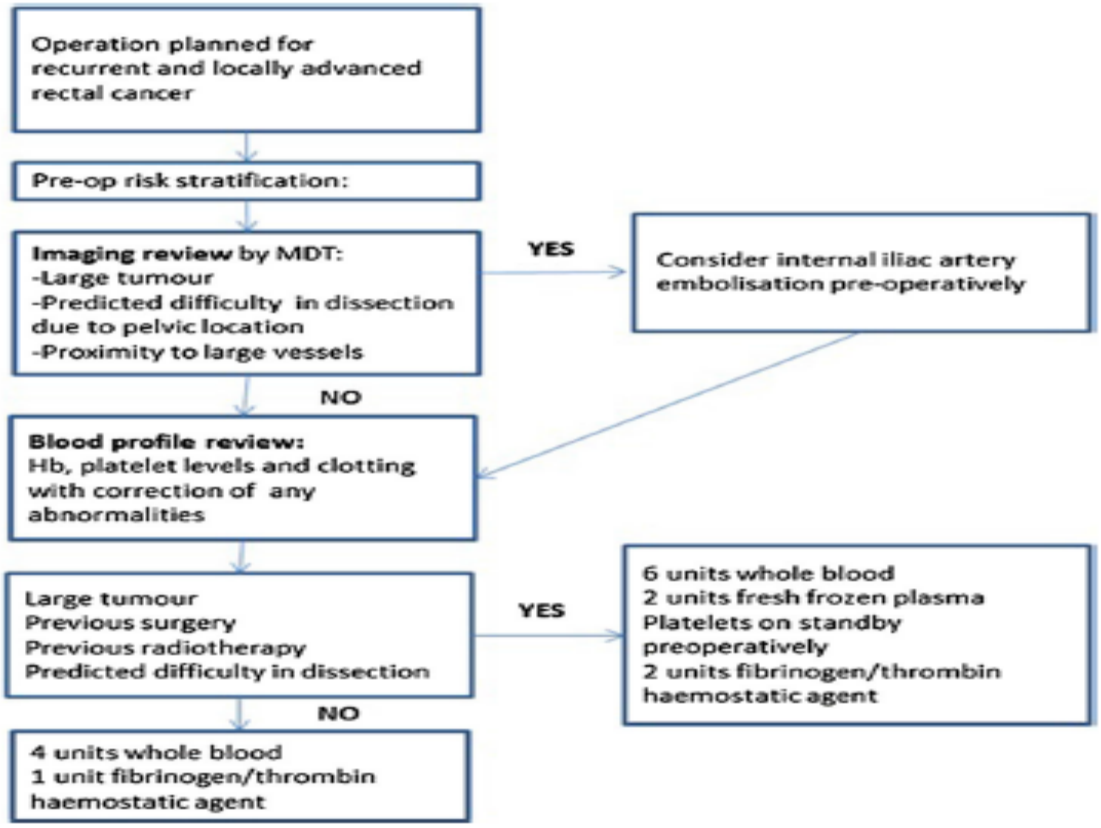
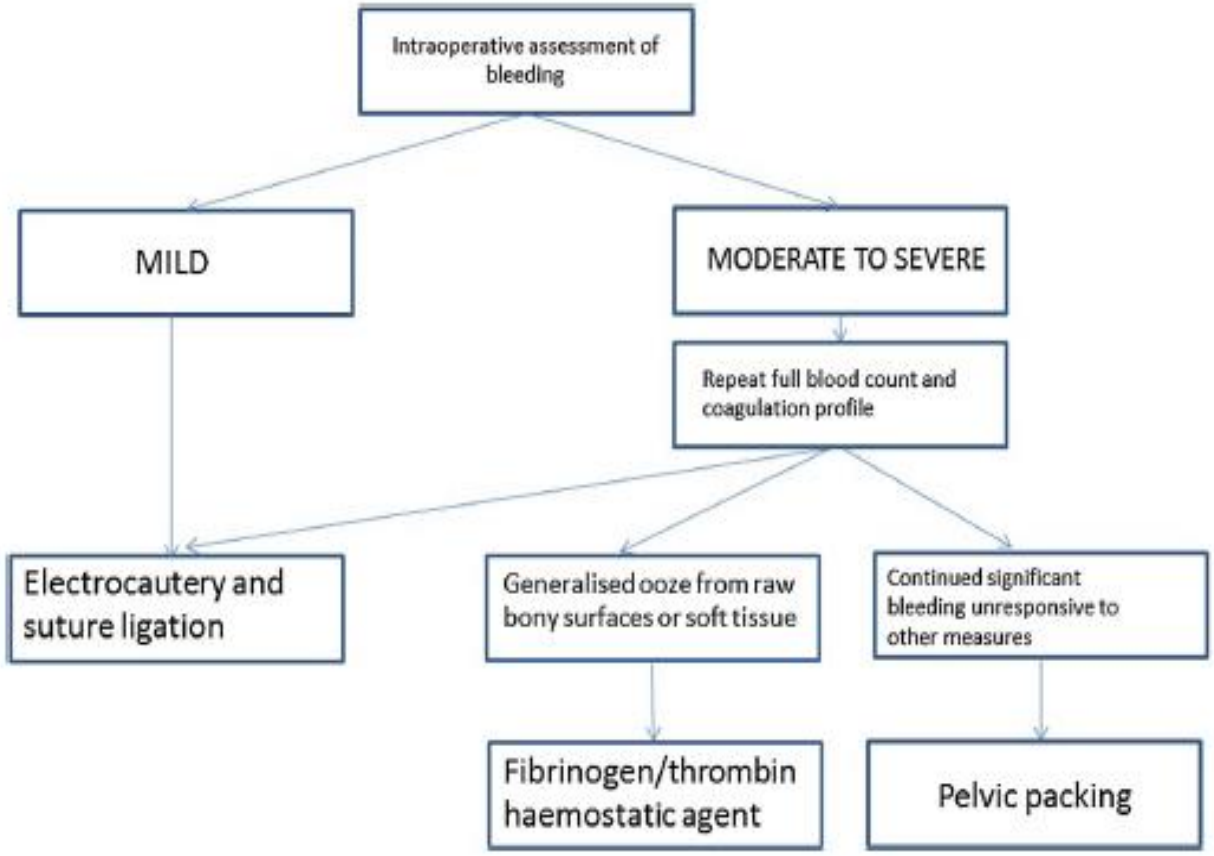


Fig. 1 Preoperative assessment of bleeding risk

Bonello. *Tech Coloproct 2014*

Pelvic hemorrhage



Bonello. *Tech Coloproct 2014*

Hemostatic step-by-step procedure to control presacral bleeding during laparoscopic total mesorectal excision.
D'Ambra *World J Surg 2009*

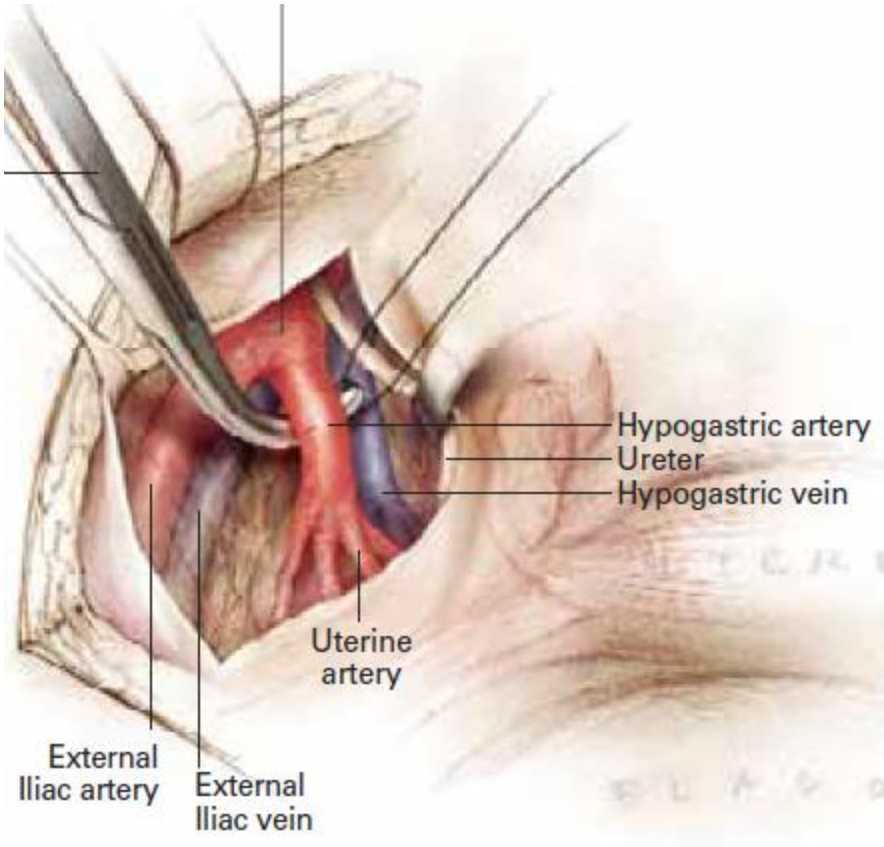
- 7 lap rectal Ca(128) ⟶ unstoppable presaccral bleeding
- first local compression
- If bleeding persists, epiploic or omental scrap use as a plug on the tip of a grasping forceps.
- On the bleeding source and monopolar coagulation is applied by electrified dissecting forceps

Pelvic hemorrhage

Hypogastric artery ligation

❖Hypogastric art. ligation controls pelvic hemorrhage in as many as 50% of cases.

❖ The major effect of hypogastric art. ligation is a decrease in pulse pressure.



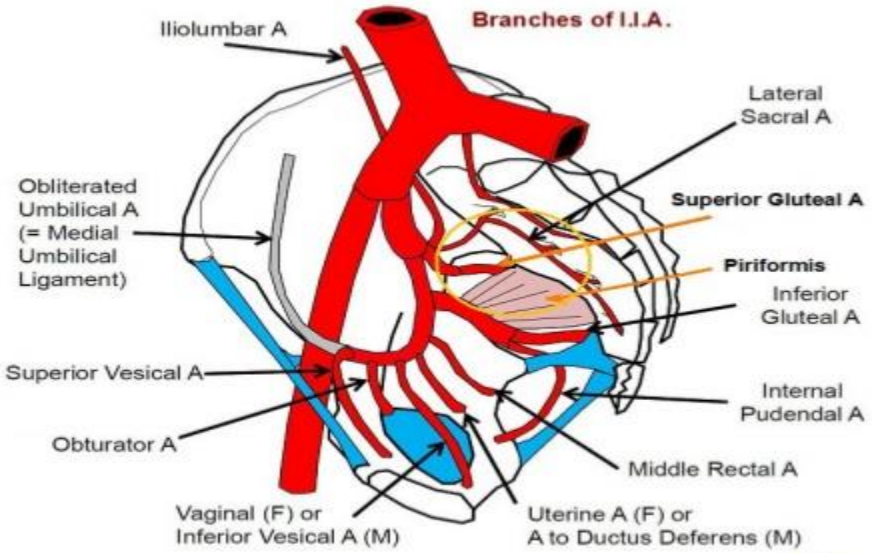
Pelvic hemorrhage

Ligation of art. can cause gluteal and vesical necrosis

Ligation

Transabdominal method with *median* or *transverse* incision is commonplace for the I.I.A. unilateral or bilateral ligation.

However, in "street-emergencies," there is a last-resort external method of approaching the I.I.A. through the ***greater sciatic foramen*** , using the ***superior gluteal artery, lateral sacralis artery, obturator artery***, and ***piriformis muscle*** as guides.



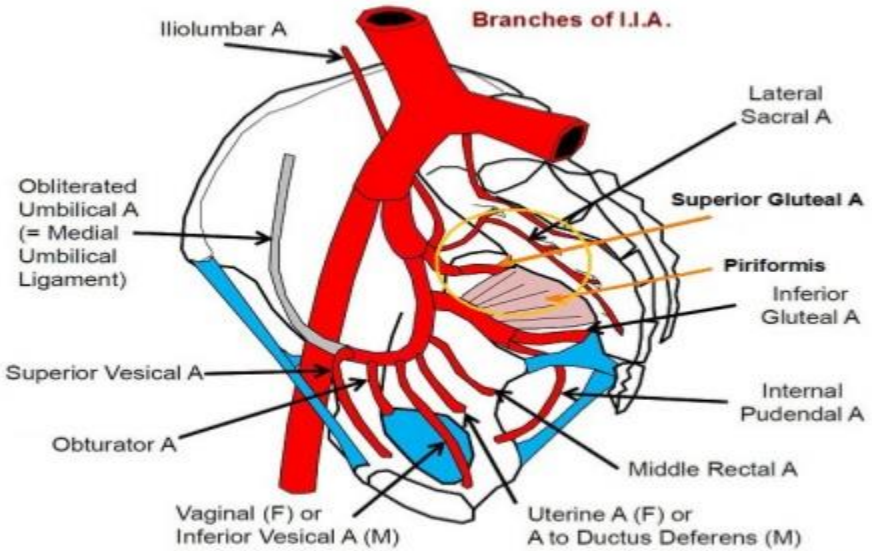
Pelvic hemorrhage

Ligation of v. can exacerbate bleeding from PSVP

Ligation

Transabdominal method with *median* or *transverse* incision is commonplace for the I.I.A. unilateral or bilateral ligation.

However, in "street-emergencies," there is a last-resort external method of approaching the I.I.A. through the ***greater sciatic foramen*** , using the ***superior gluteal artery, lateral sacralis artery, obturator artery***, and ***piriformis muscle*** as guides.



Special cases- special tools

Pelvic hemorrhage

Arterial embolization

Angiographic insertion of Gelfoam pledgets or Silastic coils may effectively control pelvic hemorrhage in up to 90% of postpartum and postoperative patients.[20,21] Hypogastric artery embolization can also be done intraoperatively.[22]

Management options to tackle bleeding during Laparoscopy

1. Applying pressure

I. Don`t panic

II. Temporize the bleeding site

- Gauge

- Lap instrument

III. Add more trocars if needed

SAGES 2013

Management options to tackle bleeding during Laparoscopy

1. **Applying pressure**
2. **Control bleeding**

I. Coagulating vessel

II. Lap clip placement

III. Lap suturing

IV. Hemostatic agent/ biologic glue

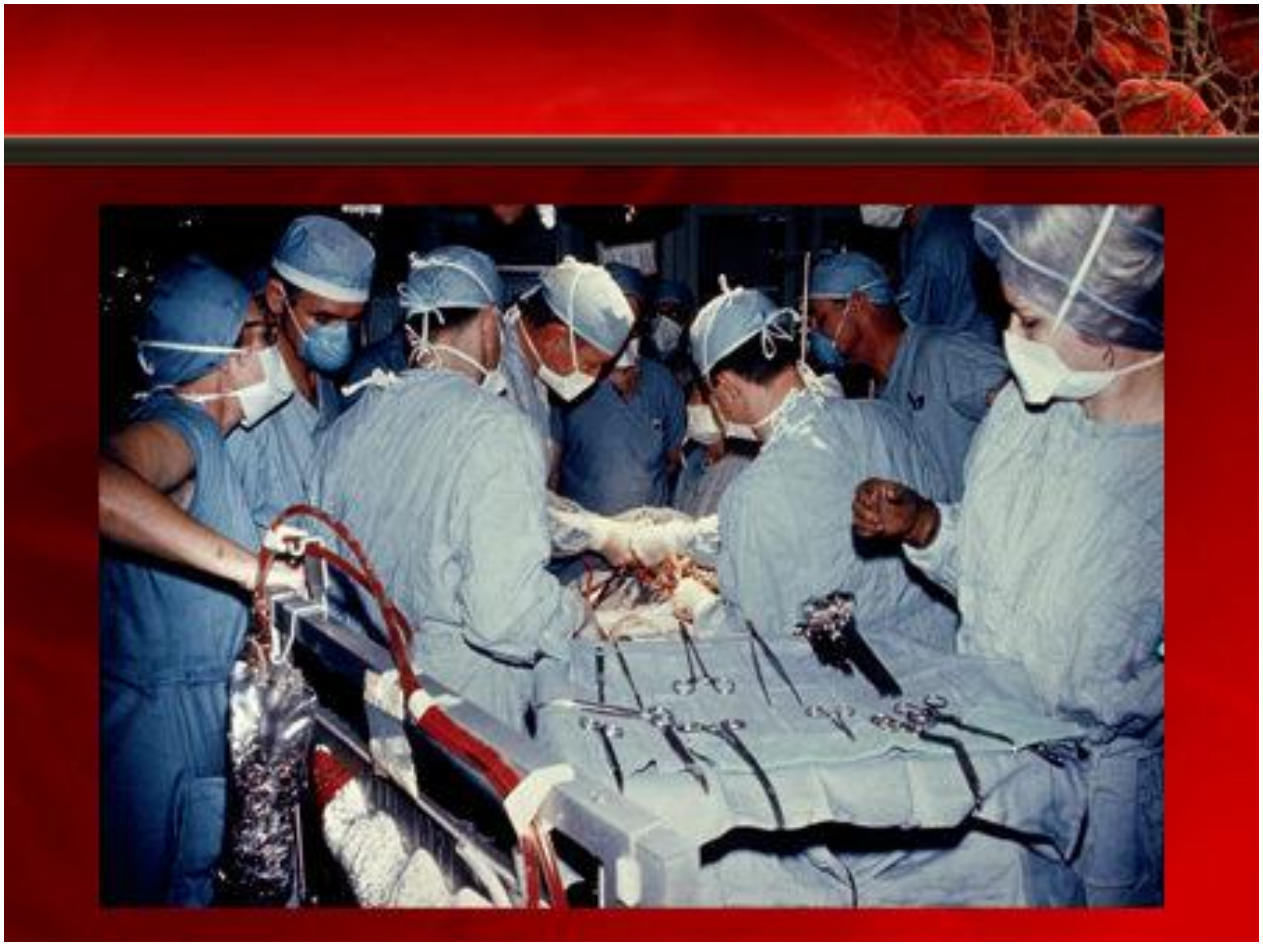
V. Argon beam coagulator

3. **Conversion to open**

SAGES 2013

Conversion A decision for the Patient's Safety or a Failure of the Surgeon?

*Take home message




感謝你
Danke
Gracias
Grazie
Merci
Thanks!
THANK
YOU!