

GENITOURINARY TRAUMA

Symposium 2012

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Outcomes

- When to suspect urogenital trauma
- Trauma in children
- Resuscitation
- investigation/s of choice
- classification of injuries
- Emergency /Initial treatment

Common scenario

- Person sustained trauma
- Haematuria

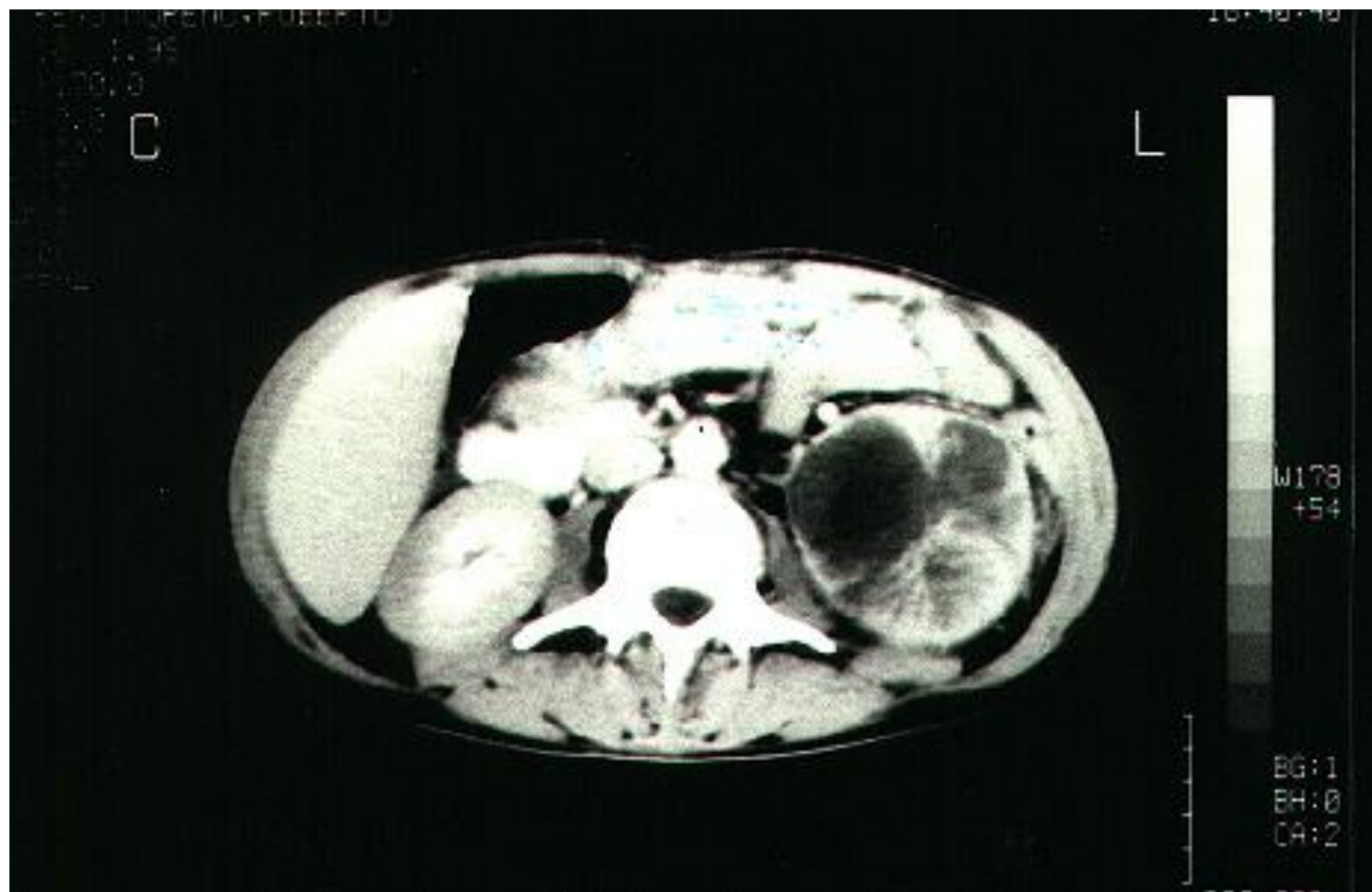
Clinical case

- 32 yrs old male
- Pedestrian vehicle accident
- Has macroscopic hematuria
- GCS 15
- BP 120/70
- Pulse 120

- Abd bruised and distended localised tenderness
- Rectal exam -NAD

Investigations

- Laboratory
 - FBC
 - U&E
 - X Match
- Radiological
 - X-rays
 - CXR, C Spine
 - Pelvis
 - Ct Scan
 - Abdomen
 - VCUG



RENAL TRAUMA

- Conservative management
 - Strict bed rest
 - Antibiotics
 - Serial hematocrit
 - Follow-up sonar 3 days
 - Serial drop in heamatocrit - second transfusion - embolization

Surgical management

- Major injury
- Expanding lateral hematoma

GENITOURINARY TRAUMA

- GUT Injuries associated- trauma to chest, abdomen and pelvis.
- Optimal management - rapid team approach
 - assessment & institution of life-preserving therapy.

This process includes:

- **Preparation- Triage**
- **Primary survey**
- **Resuscitation**
- **X-rays**
- **Secondary survey**
 - **(head-to-toe evaluation/tubes and fingers in every orifice)**
- **Re-evaluation & definitive care**

KIDNEY

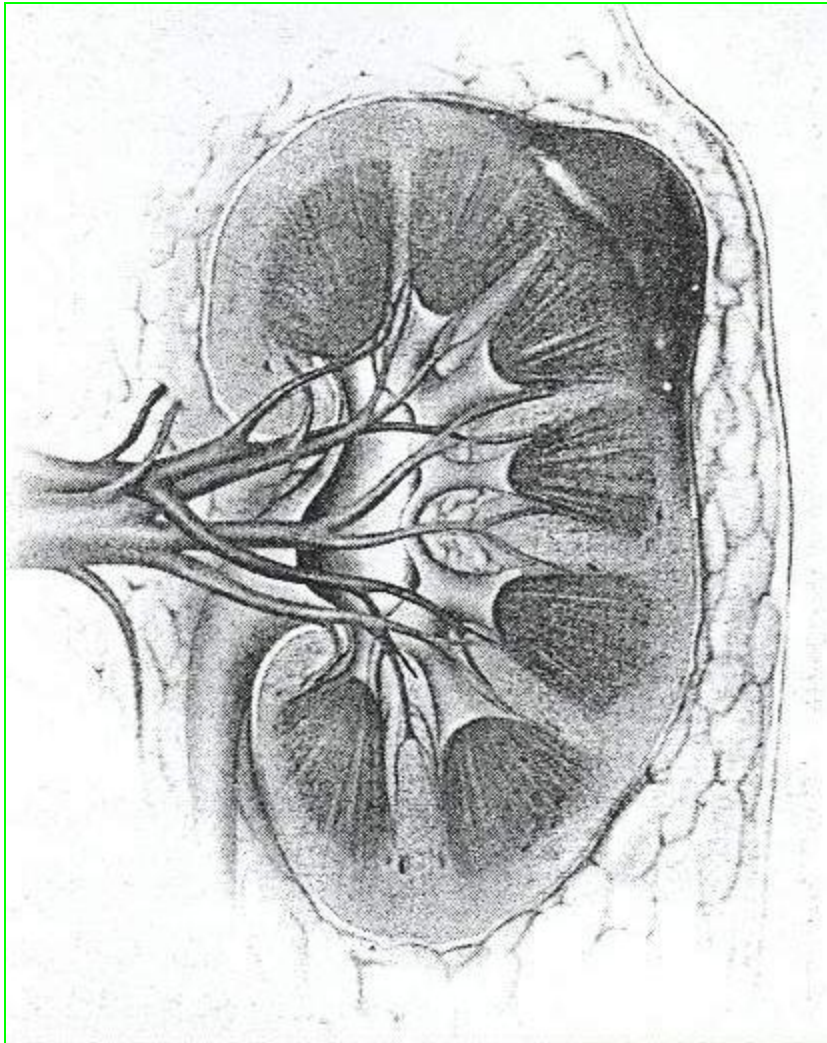
- Renal trauma - penetrating or blunt
- Clinical picture
 - Bruising
 - 12th rib Fracture
 - Shocked or stable
 - Gross or microscopic hematuria

RENAL INJURY SCALE

Grade

Injury Description

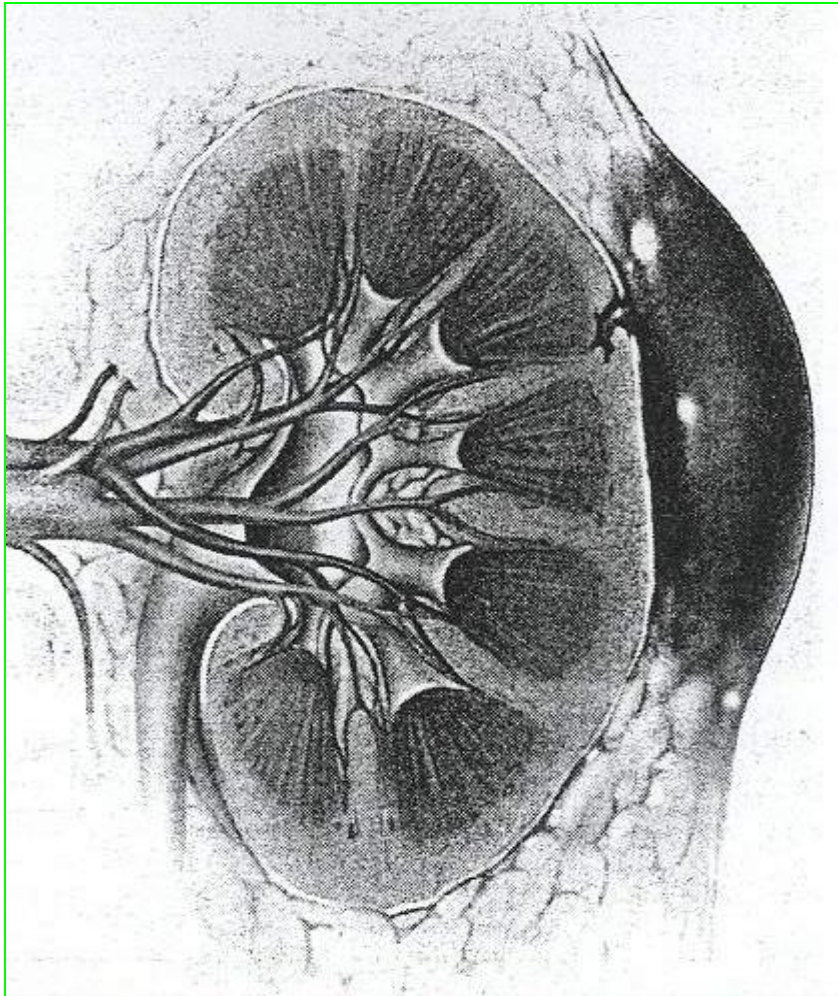
| | | | |
|-----|-----|-------------------|---|
| I | I | Contusion | Microscopic or gross hematuria, urologic studies normal |
| | | Haematoma | Subcapsular, nonexpanding without parenchymal laceration |
| II | II | Haematoma | Nonexpanding peri-renal haematoma confined to the renal retroperitoneum |
| | | Laceration | < 1 cm parenchymal depth of renal cortex without urinary extravasation |
| III | III | Laceration | > 1 cm parenchymal depth of renal cortex without collecting-system rupture or urinary extravasation |
| IV | IV | Laceration | Parenchymal laceration extending through the renal cortex, medulla, and collecting system |
| | | Vascular | Main renal artery or vein injury with contained hemorrhage |
| V | V | Laceration | Completely shattered kidney |
| | | Vascular Avulsion | Avulsion of renal hilum which devascularizes kidney |



Grade I

Renal contusion: Microscopic or gross hematuria, urologic studies normal

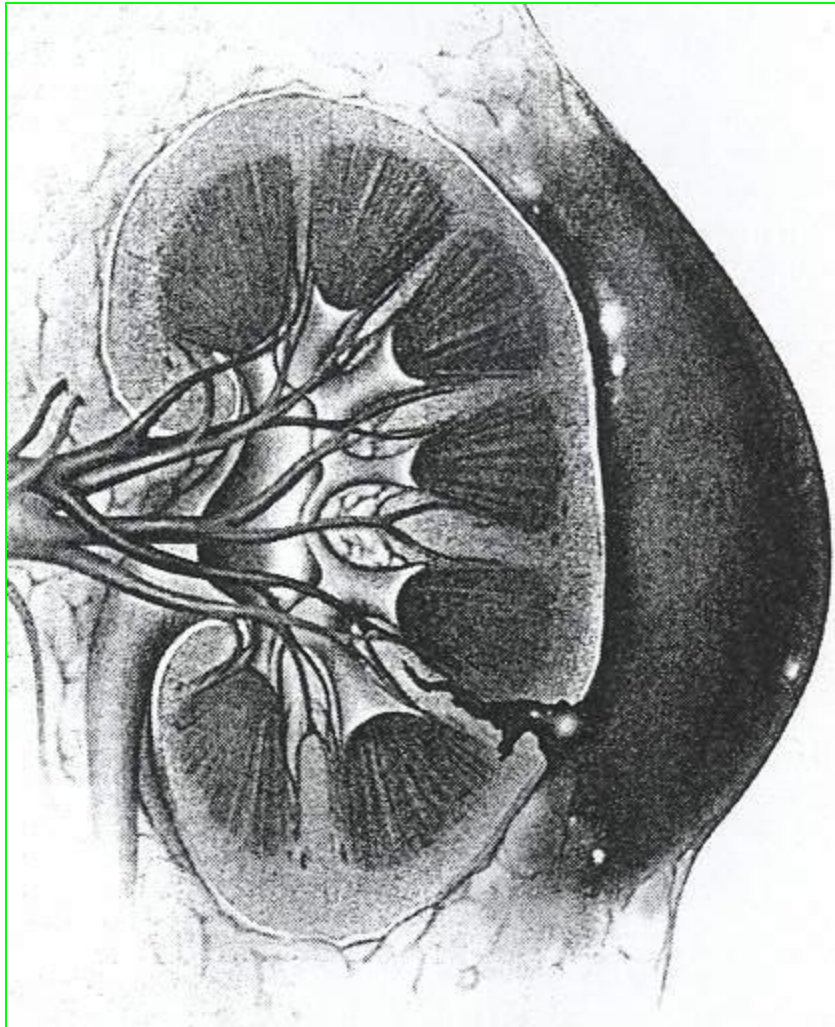
Subcapsular hematoma: Nonexpanding without parenchymal laceration



Grade II

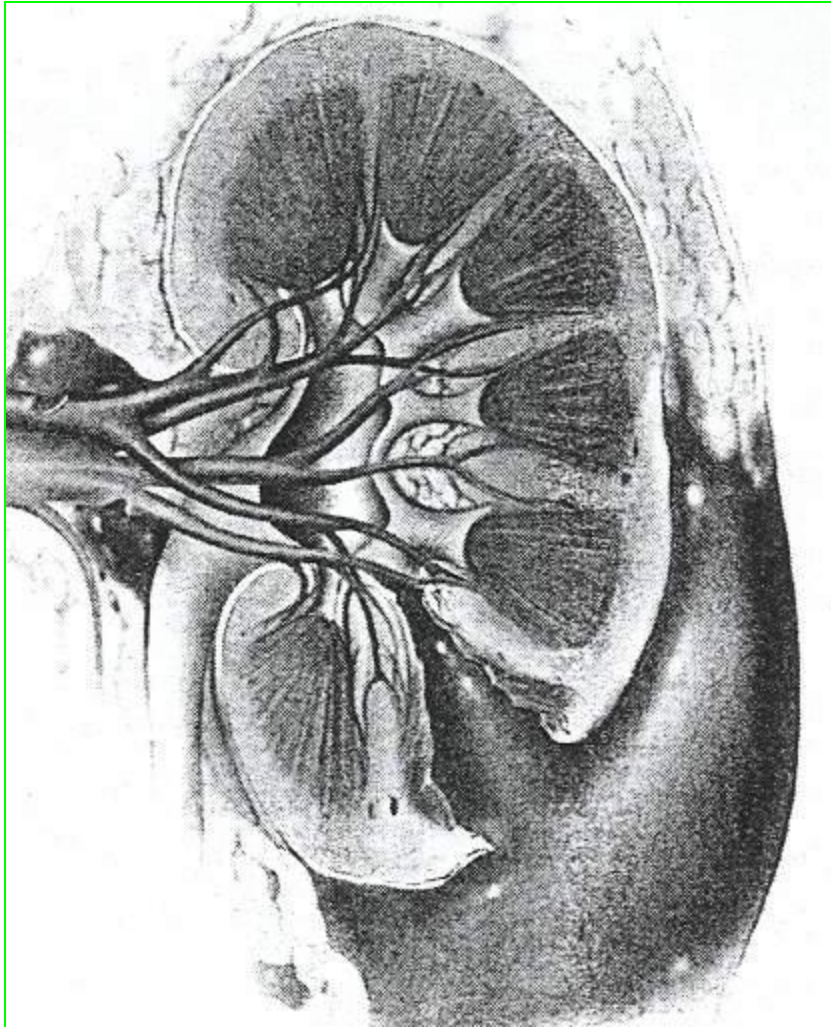
Cortical laceration: <1 cm
parenchymal depth of renal cortex
without urinary extravasation

Perirenal hematoma:
Nonexpanding, confined to renal
retroperitoneum



Grade III

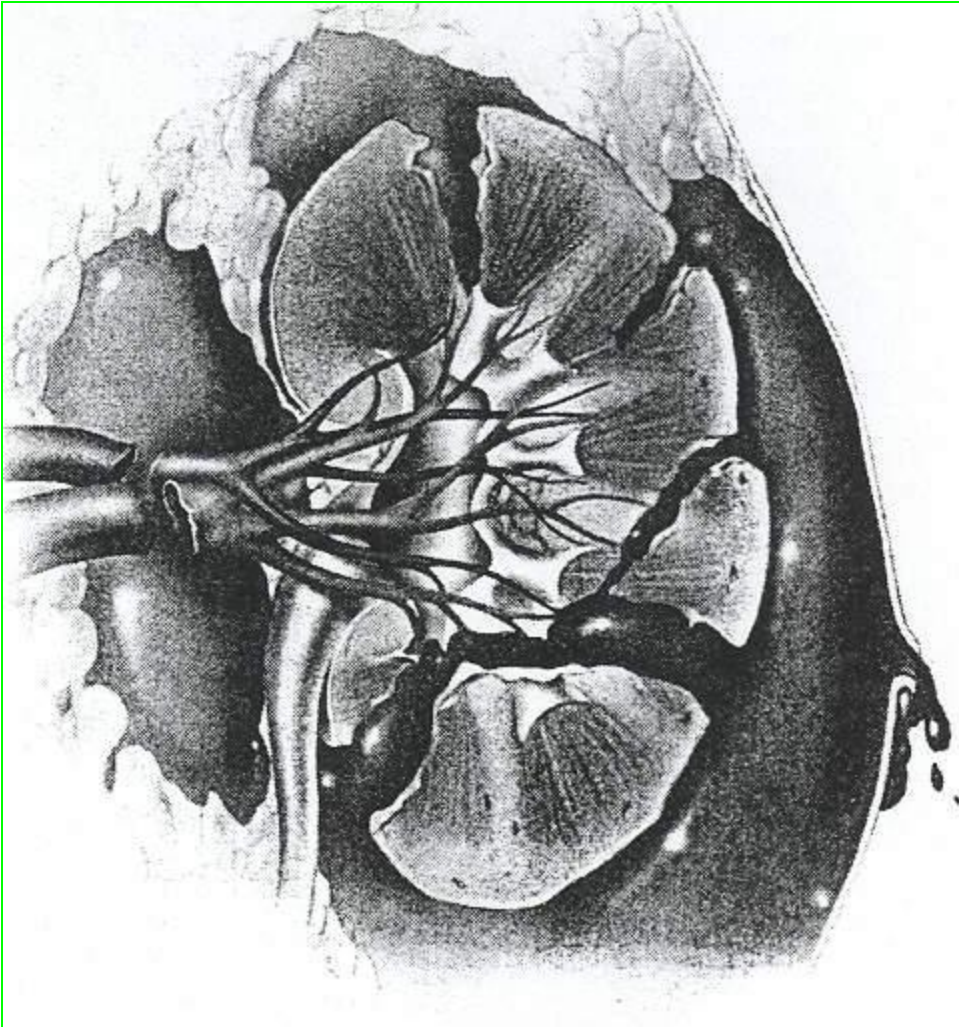
Parenchymal laceration: Deep, >1 cm parenchymal depth of renal cortex without collecting system rupture or urinary extravasation



Grade IV

Parenchymal laceration:
Involving the collecting
system, with or without a
devascularized segment

Vascular: Main renal artery
or vein injury with
contained hemorrhage

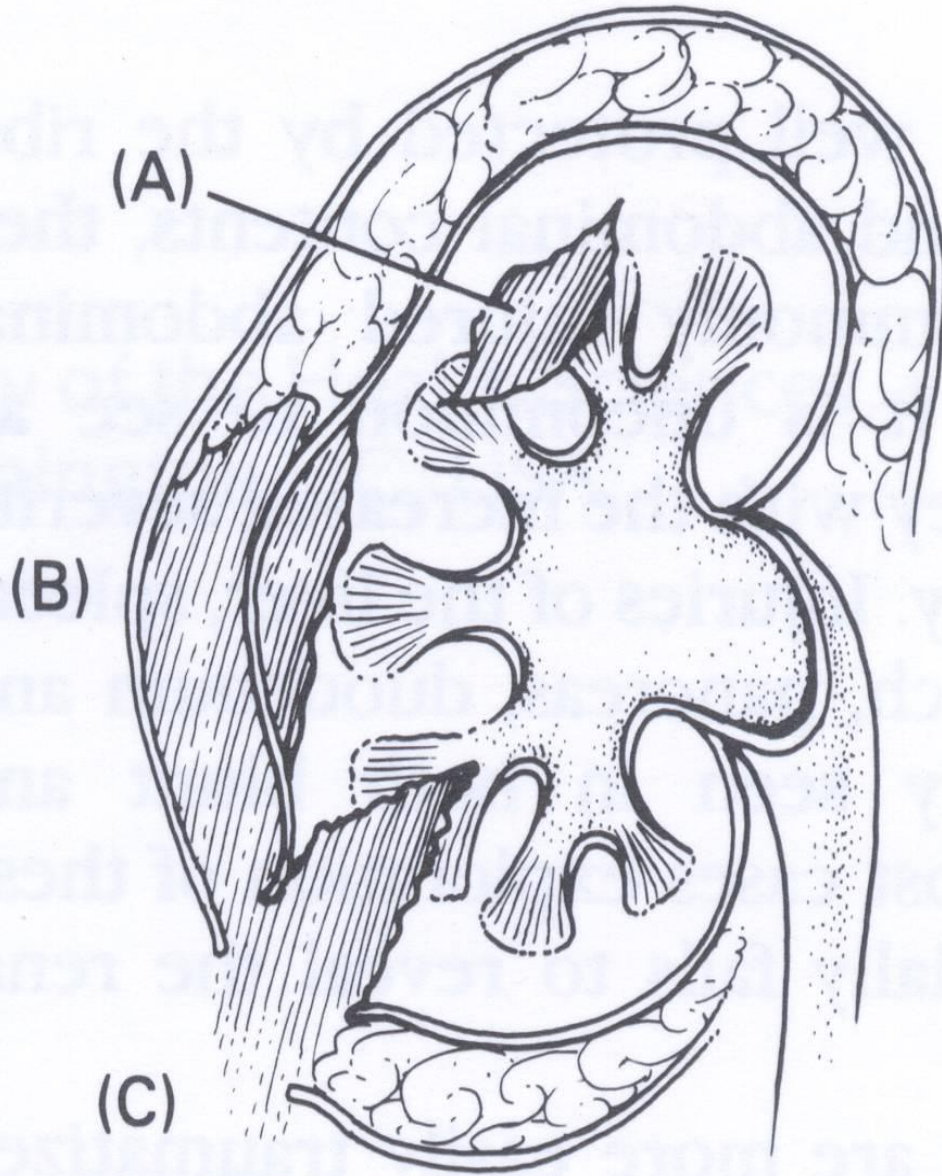


Grade V

Laceration: Completely shattered kidney

Vascular: Renal artery thrombosis, avulsion of the renal pedicle

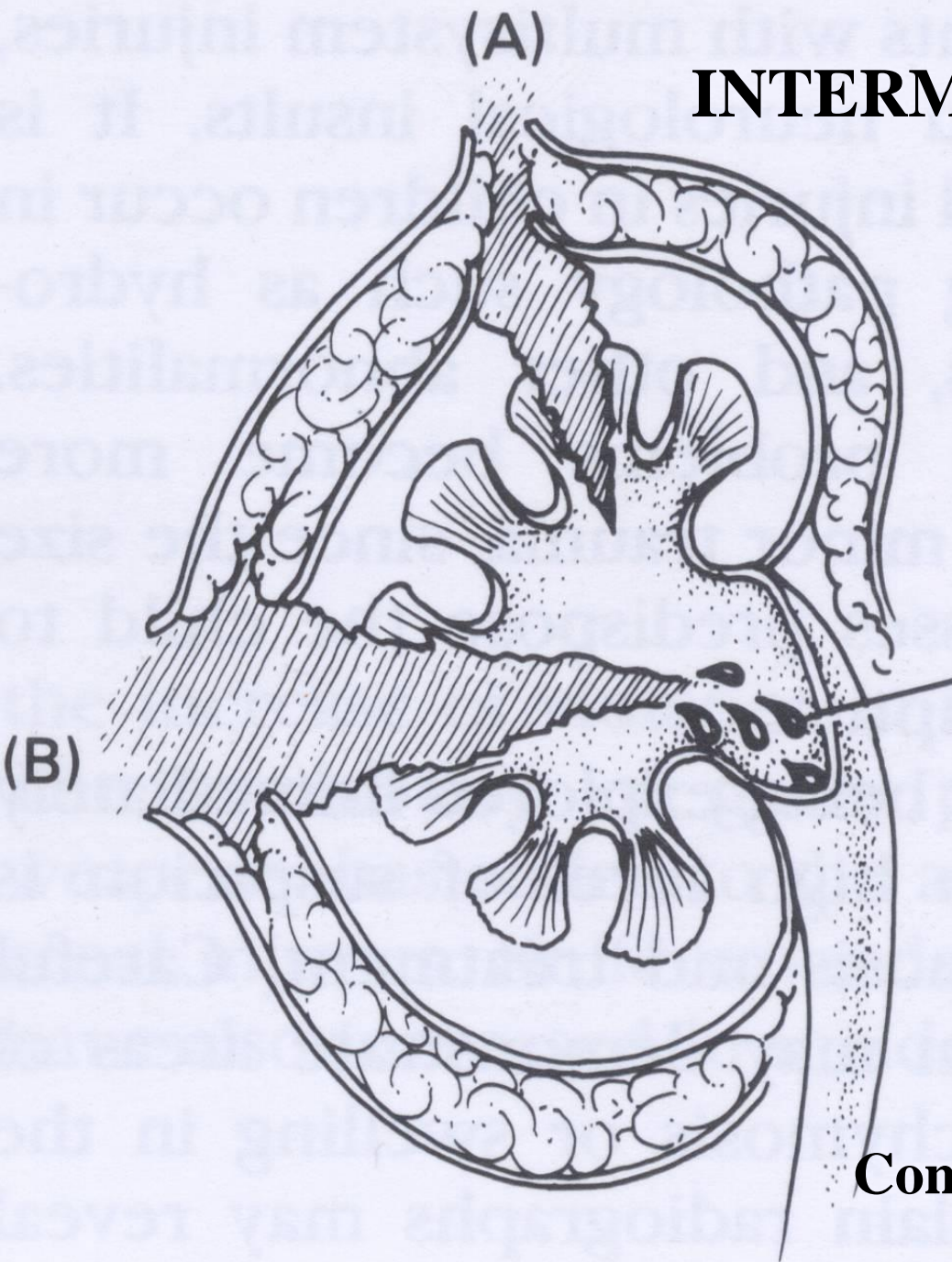
MINOR (85%)



- A. Contusion
- B. Subcapsular haematoma
- C. Superficial laceration

Conservative management

INTERMEDIATE (10%)

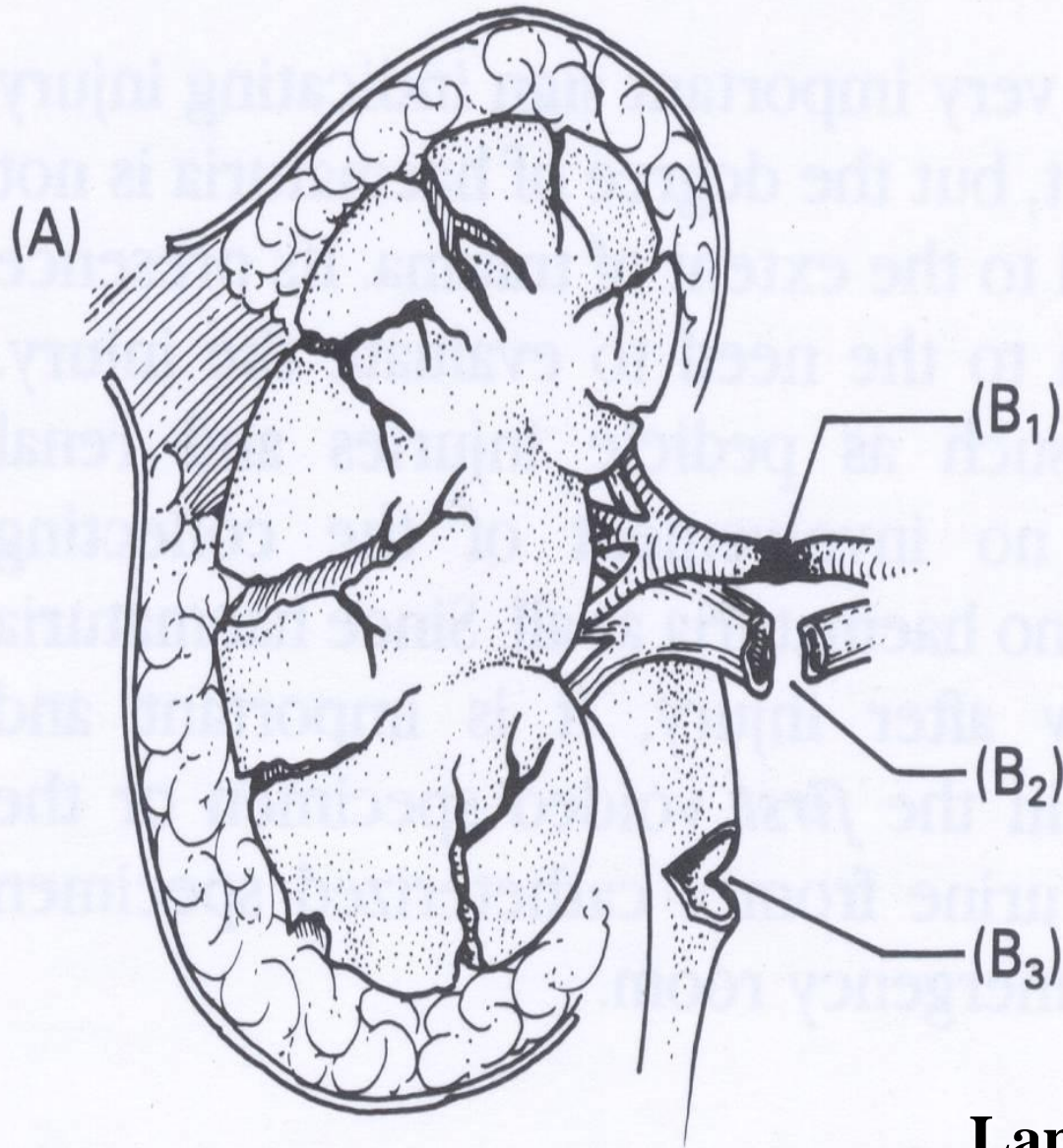


(C)

- A. Fracture
- B. Deep laceration
- C. Pelvic and valiceal tears

Conservative or laparotomy

MAJOR (5%)



A. Shattered kidney

B. Pedicle injuries

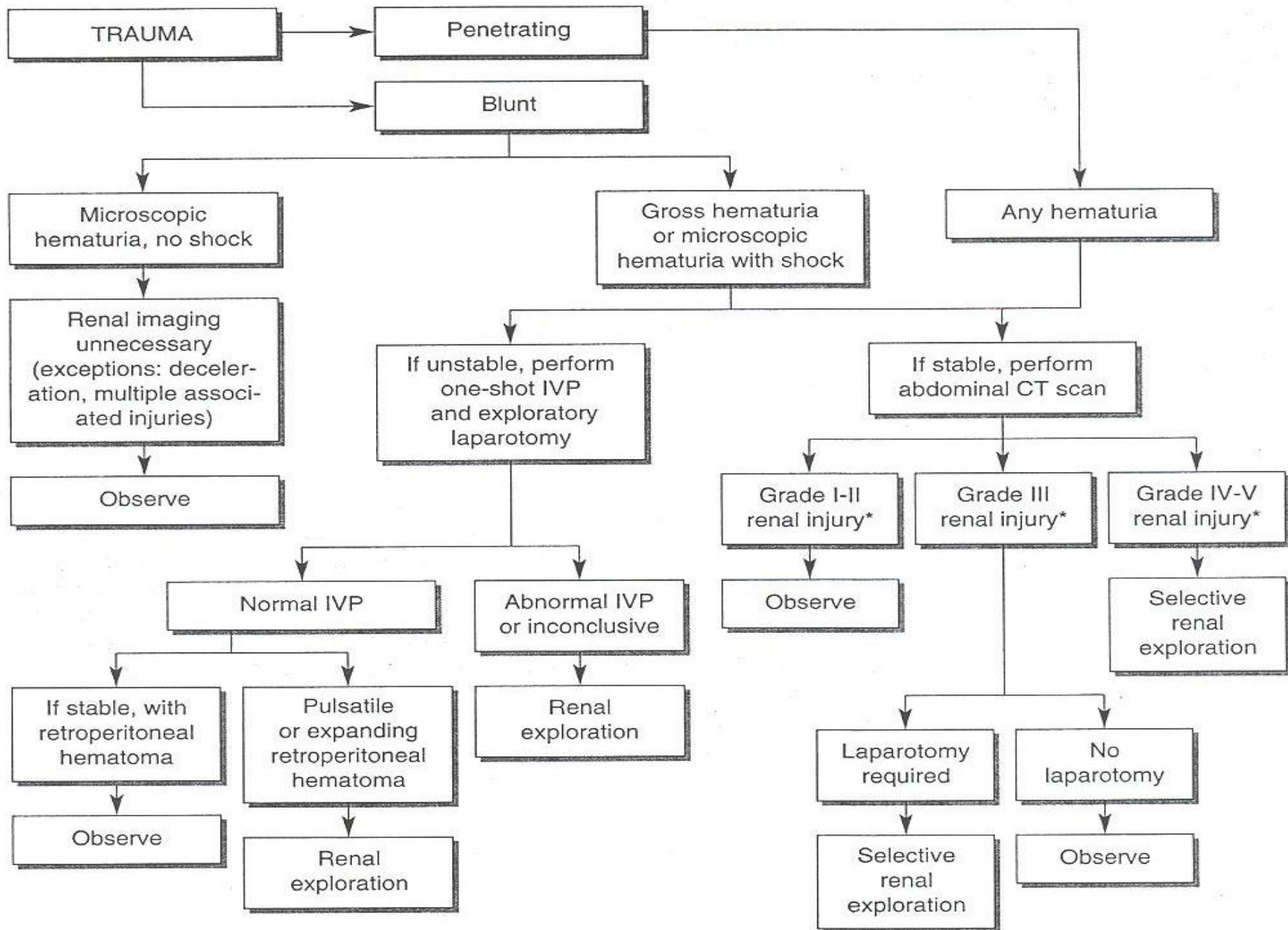
B1. Renal artery
thrombosis

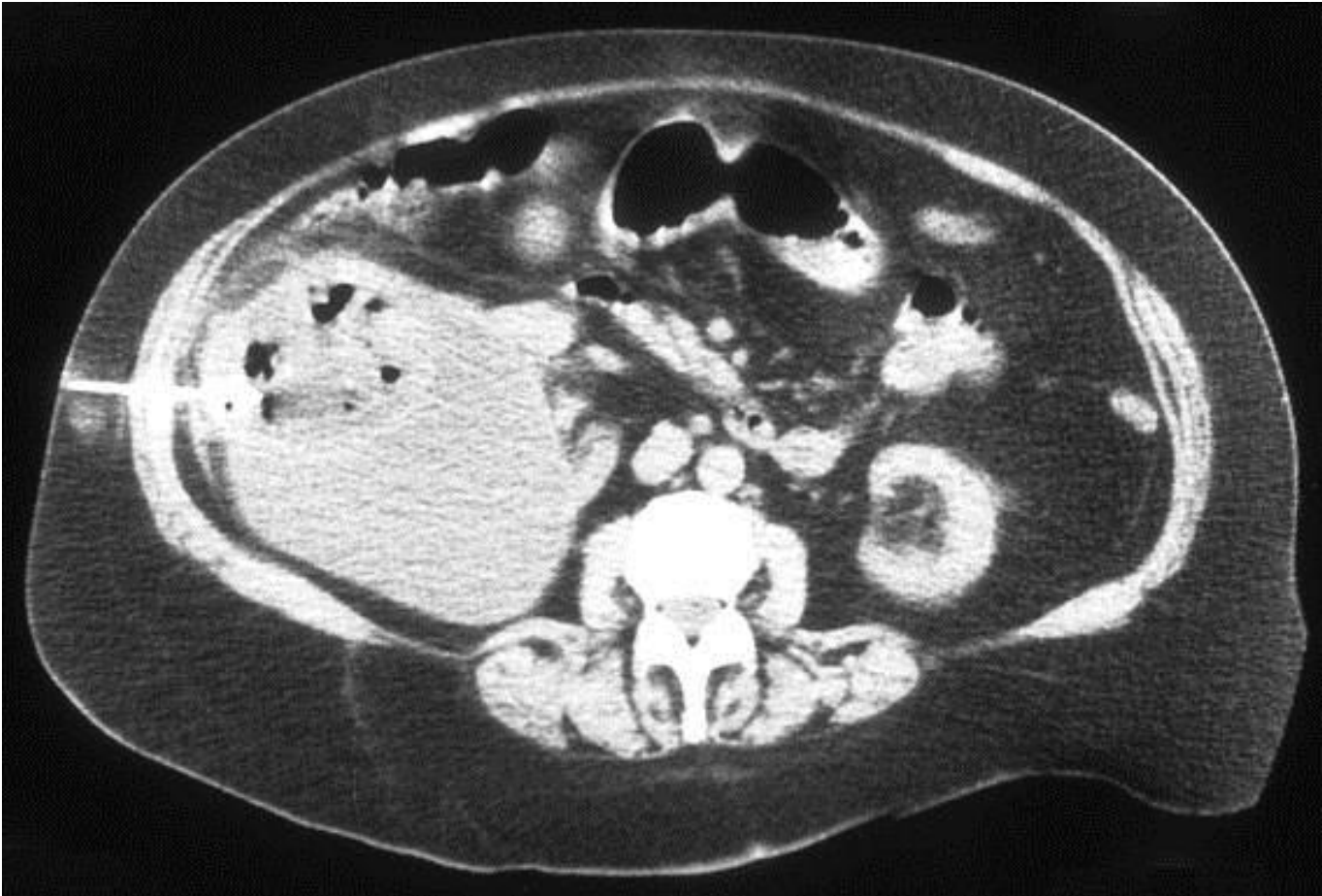
B2. Vessel injury

B3. Pelvis injury

Laparotomy

Management algorithm for adult renal trauma





RENAL TRAUMA IN CHILDREN

- Criteria for special investigations
 - Gross hematuria
 - >50 RBS/ hpf on MCS
 - Hypotension is a late manifestation thus not reliable

Who requires radiological evaluation

- Hematuria
- Flank pain
- Stab wound
- Gunshot wound
- ?

- penetrating trauma -Flank abdominal
 - 30% ureteric injury without hematuria
- Blunt trauma
 - With gross hematuria
 - Microscopic hematuria + shock
 - Pediatric
 - Deceleration injury

Why is IVP NOT the gold standard any longer?

- Correct staging?
- 30% false information of major injuries
- Can't differentiate -minor vs. major
- 60% nonfunctioning kidney
- Associated intraabdominal injuries?

OBJECTIVES OF IMAGING

- Stage the injury
- Recognize pre-existing pathologies
- Function of opposite kidney
- Identify ass. Injuries
- CT Scan = gold standard

URETERIC TRAUMA

The ureter - least commonly injured portion of the genitourinary tract.

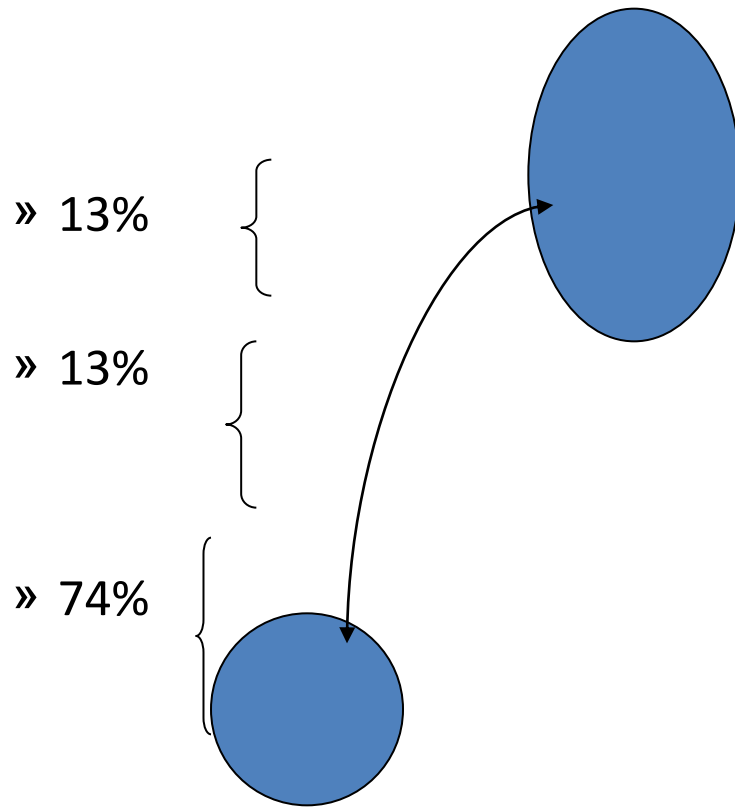
Small size, mobility, protected location

1% of all urinary tract trauma

CAUSES

- External trauma (penetrating or blunt)
 - Blunt-18%
 - # lumbar process
 - Thoracolumbar dislocation
- Iatrogenic -75%
 - 70% gynaecological
 - 15% general surgery
 - 15% urology
- Penetrating -7%

level



URETERIC TRAUMA

- Clinical picture
 - Method of injury – High index of suspicion
 - Micro/macro hematuria
 - 25 – 45% stab/gunshot injuries = NO HEMATURIA
 - Visceral injury – common (39 – 65%)

URETERIC TRAUMA

- Diagnosis
 - CT – Abdomen with AXR post contrast
 - One shot IVP intra operatively
 - Retrograde pyelogram
 - Surgical exploration of projectile tract



MANAGEMENT

Ureteral injuries are classified based on five criteria that affect the management

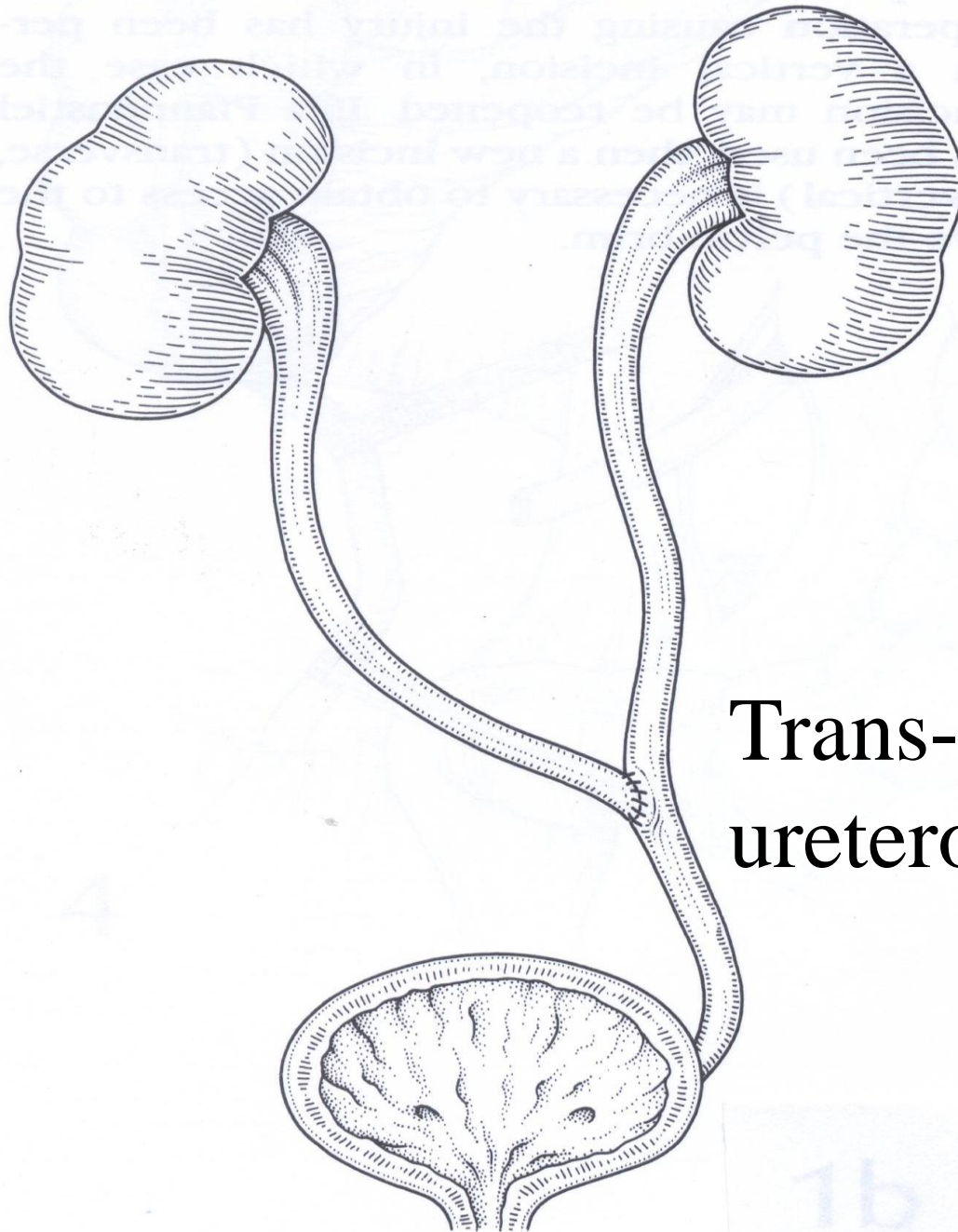
- Grade of injury
- Mechanism of injury (blunt versus penetrating)
- Level of injury (upper, middle, lower)
- Time of recognition (immediate versus delayed)
- Presence of associated injuries

URETERIC TRAUMA

- WHAT CAN YOU DO?
- Unsure
 - Tie of ureter and place a clip(proximal and distal)
 - Refer
 - Nephrostomy + referral delayed
- Surgical experience
 - Primary ureteroureterostomy over a JJ stent
 - Place a pencil drain in the area

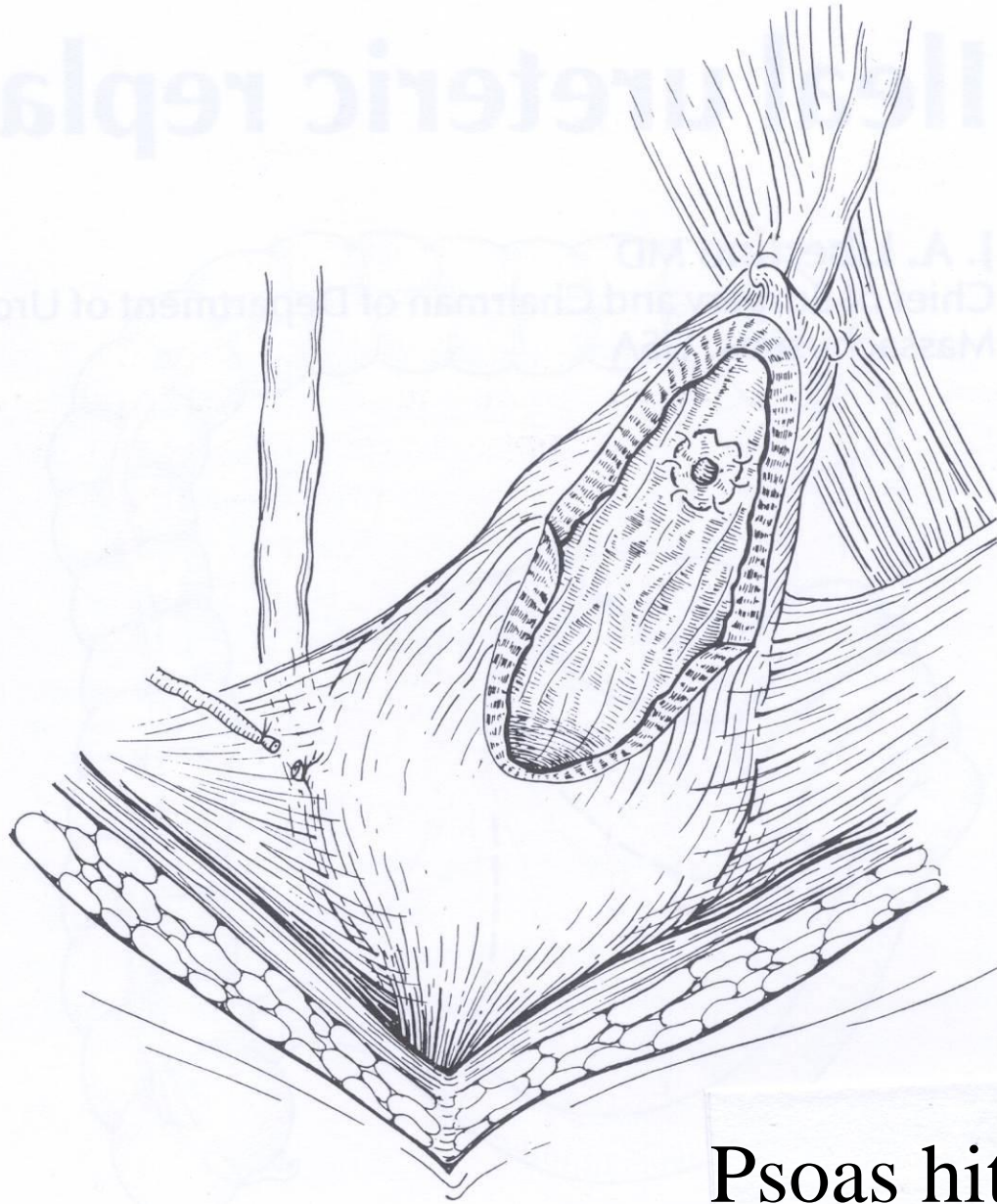
Open surgical repair depends on the level and extent of ureteral injury.

- Direct end-to-end re-anastomosis
- Ureteroneocystostomy
- Psoas-hitch technique
- (Boari-Ockerblad flap)
- Trans-uretero-ureterostomy
- Ileal ureteral substitution
- Autotransplantation
- Nephrectomy



Trans-
ureteroureterostomy

1b



Psoas hitch

Thank you

BLADDER TRAUMA

- **Blunt and penetrating trauma**
 - **Extraperitoneal rupture- 60%**
 - **Intraperitoneal rupture-30%**
 - **Combined-10%**

ASSOCIATED INJURIES

- 80% pelvic fractures
- 15% associated with urethral ripturer

BLADDER TRAUMA

- Clinical picture
 - Gross haematuria – 80-95%
 - Microscopic haematuria 10-15%
 - abdominal tenderness
 - Pelvic/perineal bruising
 - Inability to void
 - Absent bowel sounds
 - Abdominal sepsis(late) + High urea and creatinine

BLADDER TRAUMA

- Diagnosis
 - Urethrogram – normal – pass catheter
 - Cystogram = gold standard
 - Control X – Ray
 - 300 – 400 ml contrast
 - AP + lateral
 - Empty bladder
 - AP

BLADDER TRAUMA

Management

- Intraperitoneal rupture
 - High mortality rate
 - Surgical repair
- Penetrating injuries
 - Surgical repair

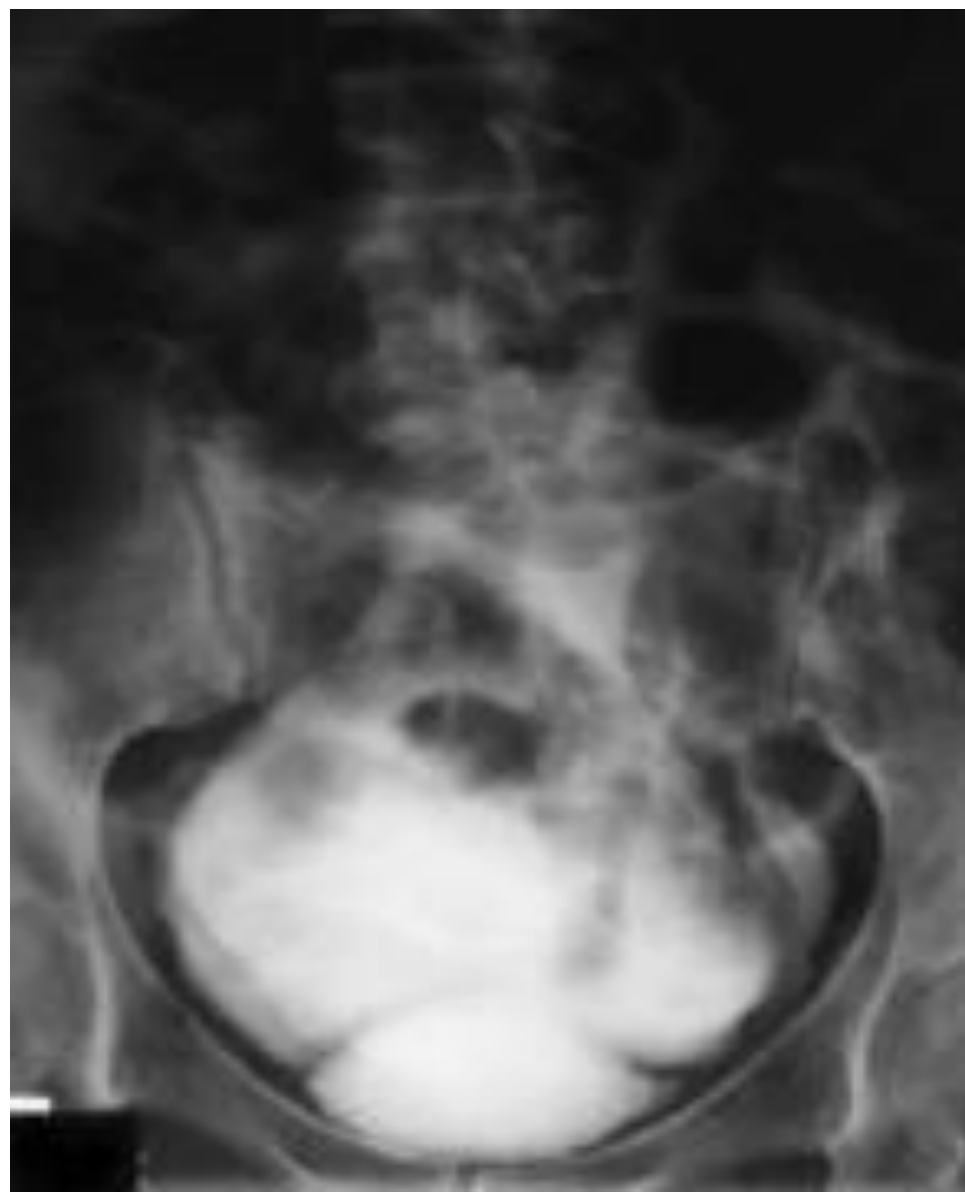
- Extraperitoneal rupture

- Look for bone fragment
- Bladder neck involvement

} Surgical repair

- Two options

- Large bore catheter – F20
- Surgical repair







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URETHRAL TRAUMA

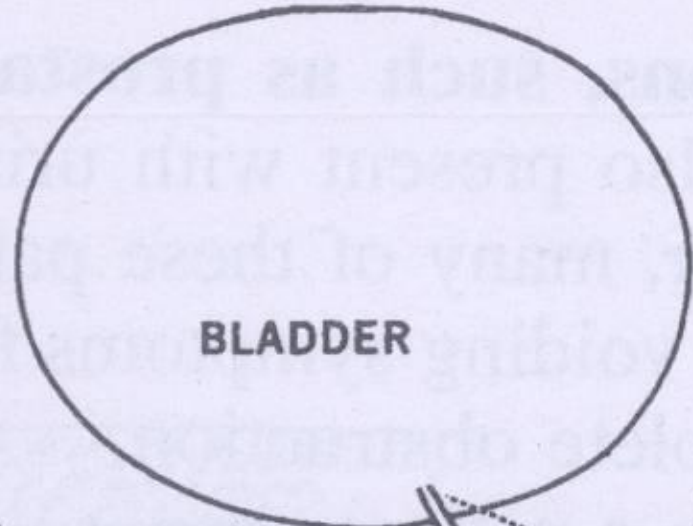
The urethra in the male is divided for treatment purposes

- anterior- (penile and bulbar) segments
- posterior (membranous and prostatic) segments.

Urethral trauma in the female is much less common than in the male

ANTERIOR
URETHRA { PENILE
 BULBOUS

POSTERIOR
URETHRA { MEMBRANOUS
 PROSTATIC



BLADDER

PROSTATIC
URETHRA

MEMBRANOUS
URETHRA

SYMMETRICAL
CONE OF BULBOUS
URETHRA

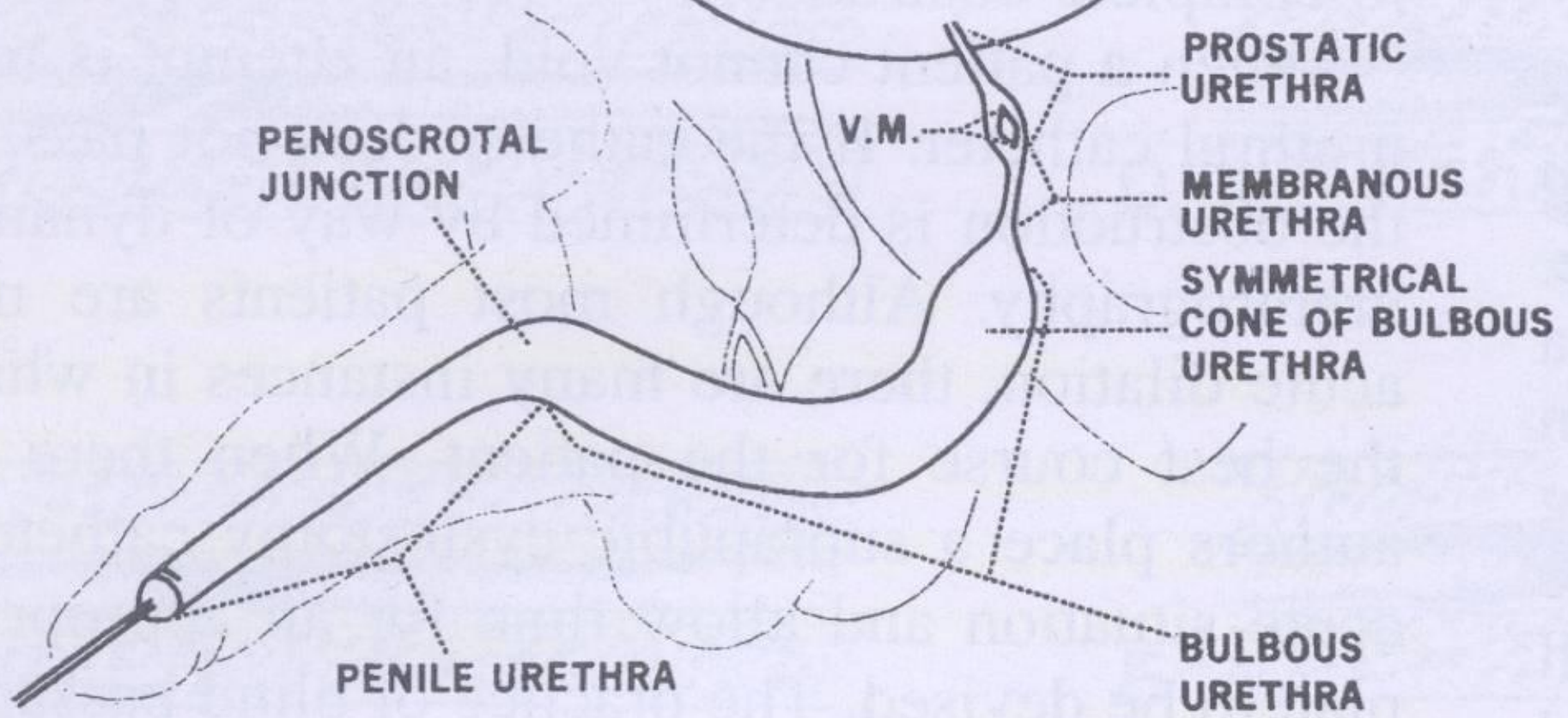
BULBOUS
URETHRA

PENOSCROTAL
JUNCTION

V.M.

PENILE URETHRA

A



URETHRAL TRAUMA

Mechanism of injury

Posterior

- Pelvic rami fracture
- Penetrating injury

Anterior

- Straddle injury
- Blunt trauma
- Penetrating trauma


URETHRAL TRAUMA

- Clinical picture
 - Meatal blood
 - Urinary retention
 - Haematoma/bruising of perineum
 - Haematuria
 - Swollen penis
 - Floating prostate

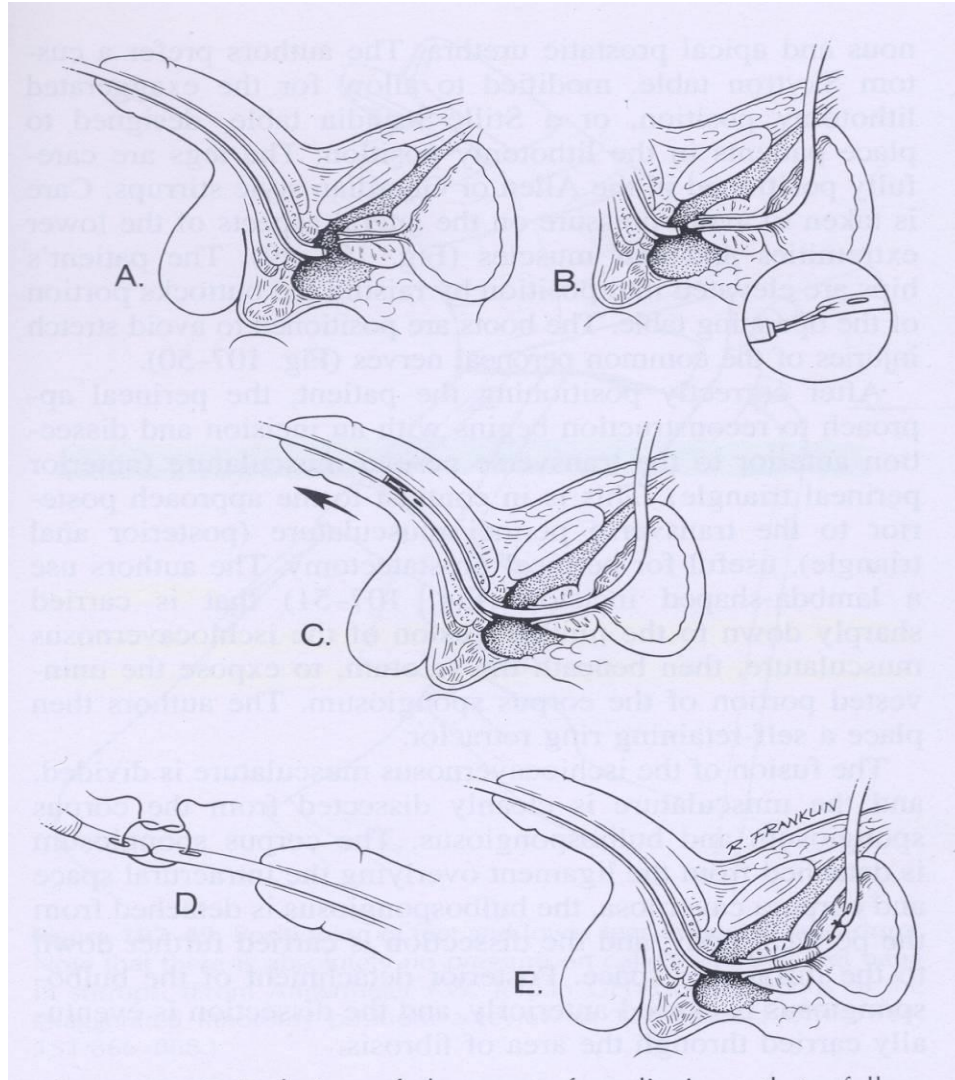
URETHRAL INJURY

TREATMENT

Posterior

- Manage life threatening injuries
- Urethrogram
 - Intact = catheterize  cystogram
 - Partial = Gentle catheterization
 - Complete = suprapubic catheter cystogram (10-17%) surgical + endoscopic re alignment -72hours (surgeon's preference)

TREATMENT



Rail roading

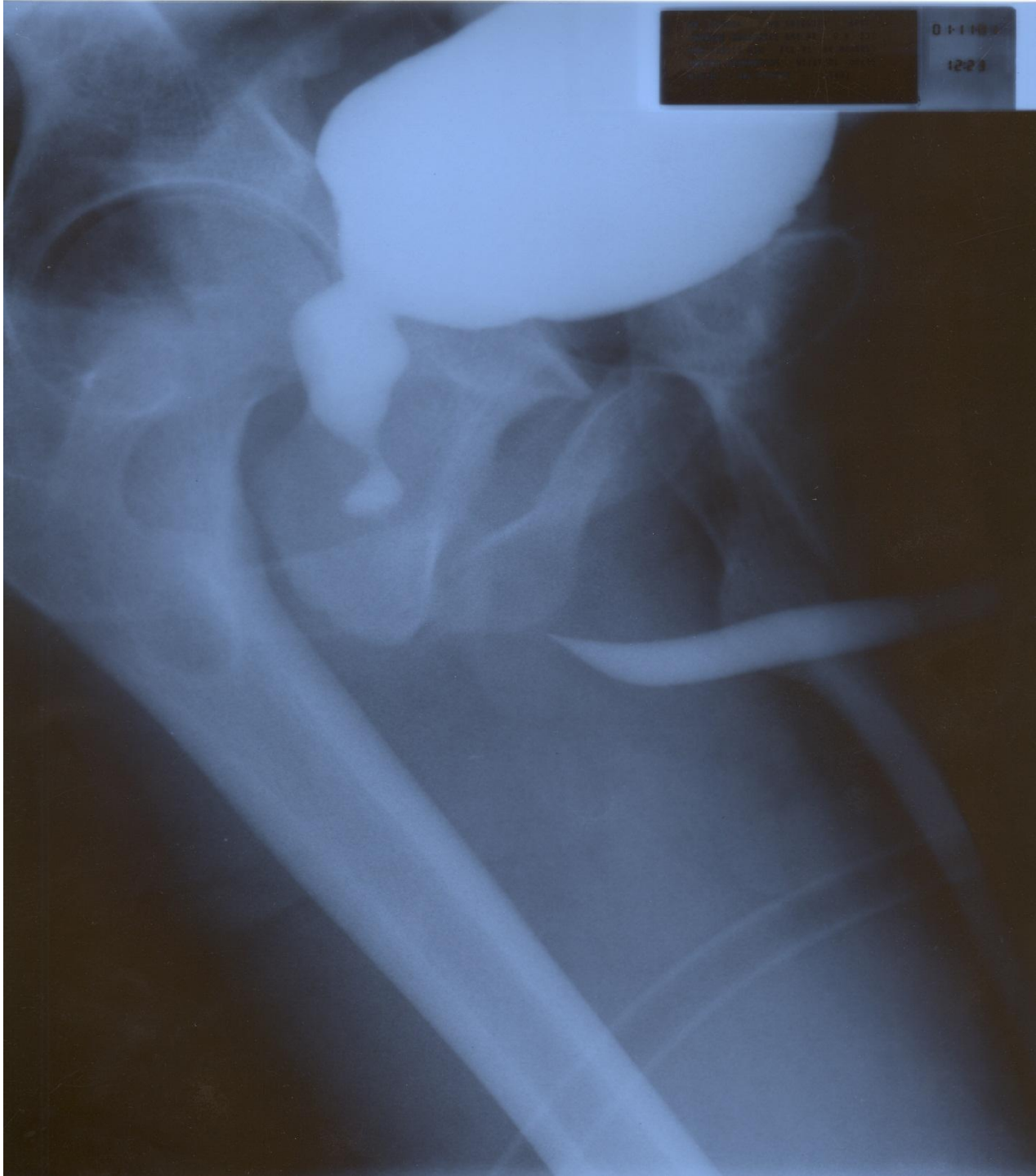
Normal Urethrogram





Urethral rupture





0-1-10

1223

URETHRAL TRAUMA

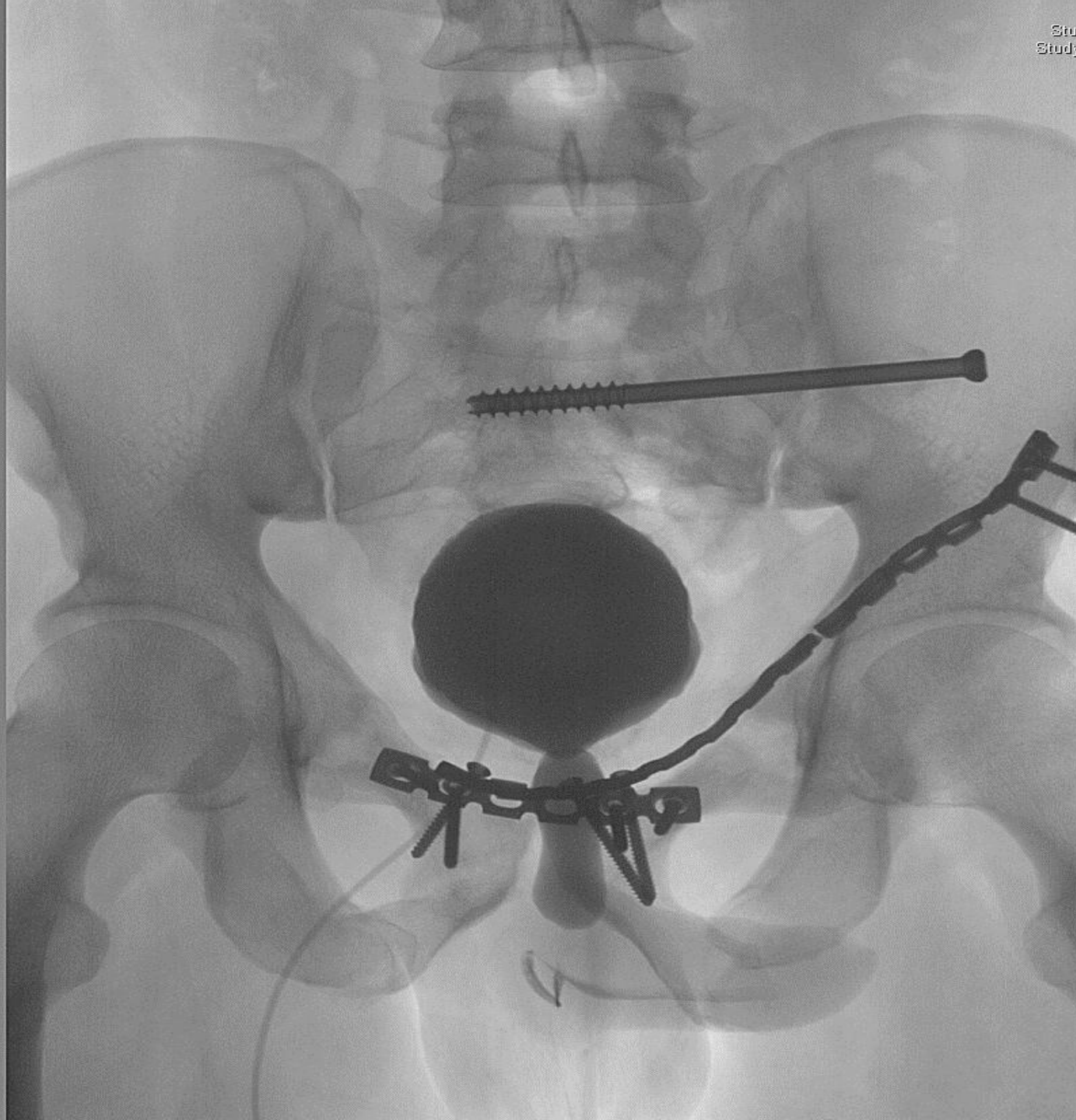
TREATMENT

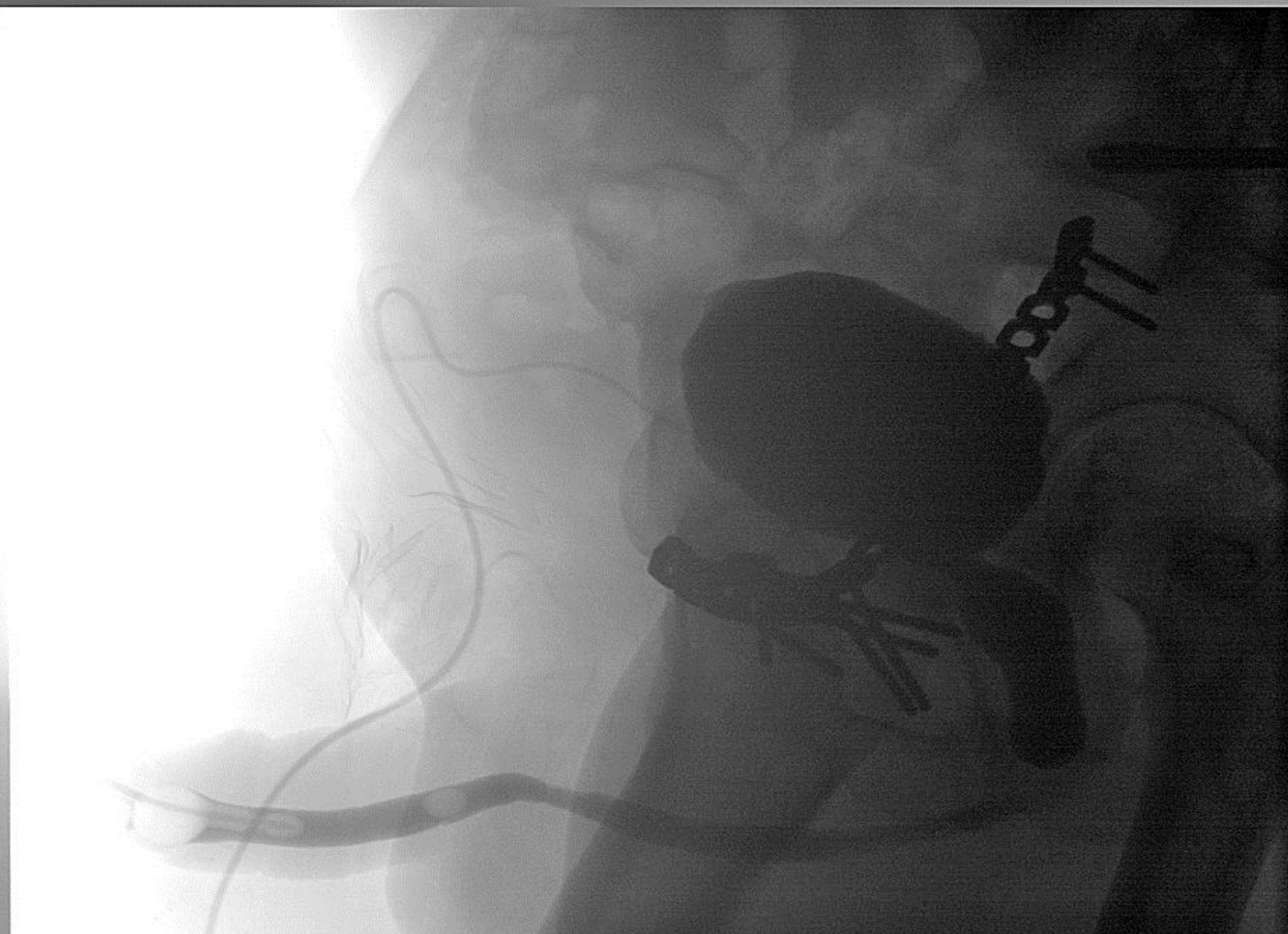
Anterior

- Penetrating – explore surgically (caution with debrediment) – primary anastomosis (bowing of penis) –
 - Unsure = dressings + s/p catheter
- Blunt/crushing injuries – urethrogram suprapubic catheter

Urethral trauma

- Complication
 - Stricture
 - Impotence
 - Incontinence





GENITOPERINEAL INJURY

Initial management

- Analgesia
- Sedation
- Antibiotics
- Irrigation
- Debridement

Urogenital Trauma

- General state
- Associated injuries
- Local extent of injury

CLASSIFICATION OF GENITOPERINEAL INJURY

1. Penetrating trauma
2. Blunt trauma
3. Zipper entrapment
4. Burns (thermal, chemical or electrical)
5. Avulsion injuries
6. Penile fracture
7. Penile amputation
8. Penile strangulation
9. Human and animal bites

Penile fractures

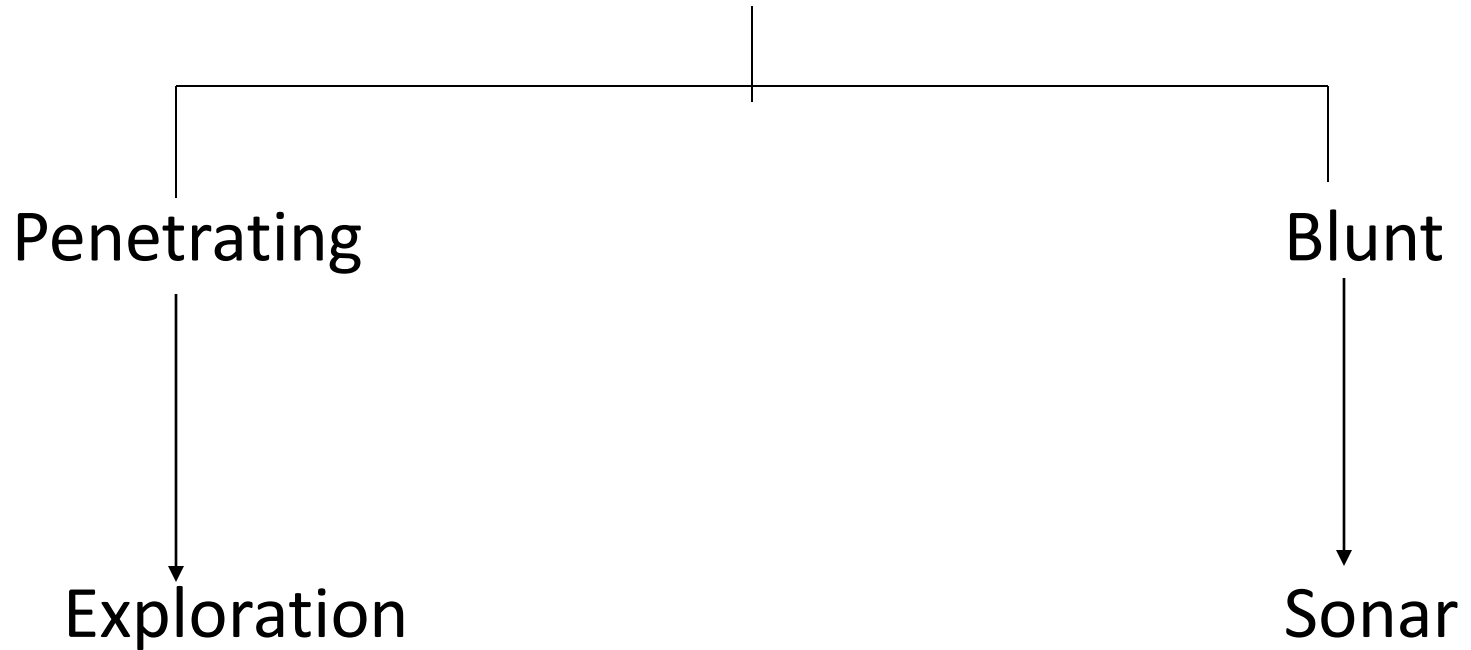
- Clinical
 - Popping sound
 - Pain
 - Immediate detumescence
 - Penile hematoma + bruising
- Surgical exploration
 - Circumcision skin incision
 - Deglove penile skin
 - Repair tunica albuginea

Complications

- Early
 - Bleeding
 - Infection
- Late
 - Erectile dysfunction
 - Chronic pain

SCROTUM AND TESTIS

SCROTAL TRAUMA



SCROTUM AND TESTIS

BLUNT TRAUMA – WHO TO EXPLORE

- Uncertain clinical/sonar findings
- Massive hematocele
- Intra testicular hematoma
- Testicular rupture
 - Blood testis barrier

Testicular rupture



Intra testicular heamatoma

