Imaging and Interventions of the Internal Iliac Artery: From Anatomy to Endovascular Techniques

AUTHORS: Shravan Reddy Kankara, Vimal MC, Shreyas RK, Saikanth D, Dhanush J, Unnathi N, Arpitha J, Vilas MT

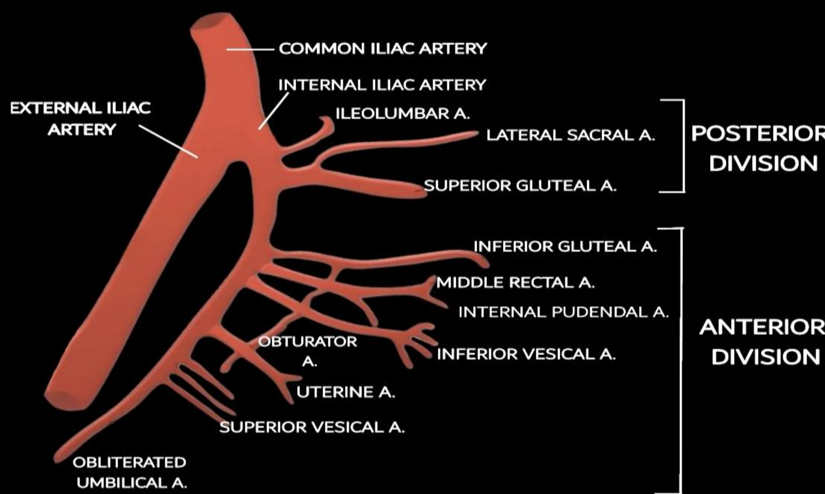
INSTITUTION: St. John's Medical College Hospital, India

INTERNAL ILIAC ARTERY ANATOMY

One of the two terminal branches of the common iliac artery

Descends into the pelvis → bifurcates into anterior and posterior divisions

Provides vascular supply to the pelvic region, gluteal area, and reproductive organs.

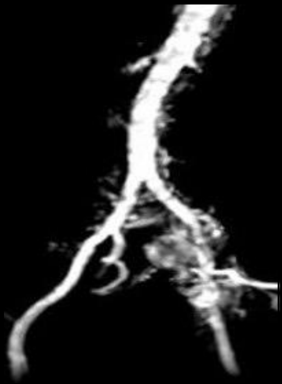


IMAGING TECHNIQUES

CT ANGIOGRAM

CLINICAL APPLICATIONS:
Assessment of **stenosis, aneurysms,** and **arteriovenous malformations**

LIMITATIONS:
- Ionizing radiation
- Contrast-induced nephropathy



MR ANGIOGRAM

CLINICAL APPLICATIONS:
Evaluation of **vascular anatomy, flow dynamics,** and **anatomical variations**

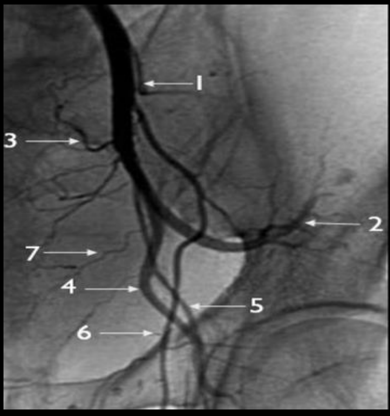
LIMITATIONS:
Limited resolution for **small, distal vessels**

DIGITAL SUBSTRACTION ANGIOGRAM

Gold standard technique

ADVANTAGES:
- **Dynamic real-time imaging**
- Enables simultaneous **diagnosis and therapeutic intervention**

LIMITATIONS:
Invasive procedure



BRANCHES

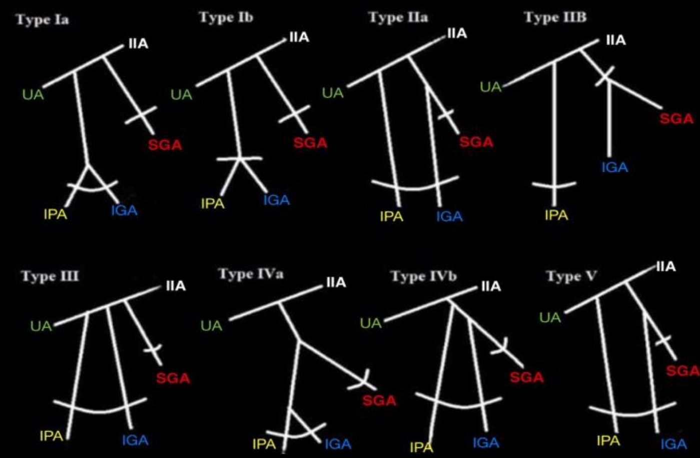
1. Iliolumbar artery
2. Superior gluteal artery
3. Lateral sacral artery
4. Inferior gluteal artery
5. Internal Pudendal artery
6. Obturator artery
7. Vesical artery

ADACHI'S CLASSIFICATION OF IIA BRANCHING PATTERNS

Crucial for **surgical planning** and **interventional procedures**

Based on the origins of the four main branches

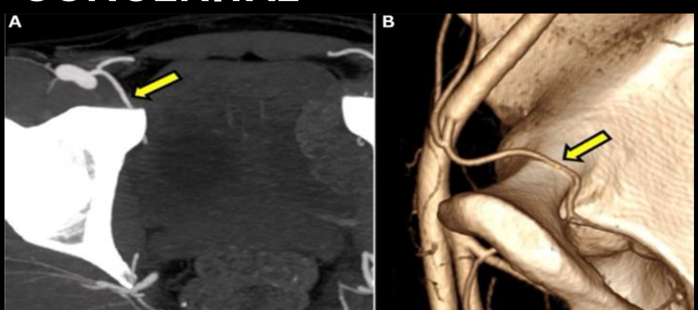
- Umbilical artery (UA)
- Superior gluteal artery(SGA)
- Inferior gluteal artery(IGA)
- Internal pudendal artery (IPA)



DISEASE CONDITIONS AFFECTING IIA AND ITS BRANCHES

CATEGORY	CONDITIONS
CONGENITAL	Hypoplasia or aplasia, Aberrant origin, Patent umbilical arteries
TRAUMA	Pelvic fractures with arterial injury, Iatrogenic injury during surgery
STENOSIS/OCCLUSION	Atherosclerosis, Radiation-induced arteriopathy, Thromboembolic occlusion
HYPERTROPHY	Uterine artery hypertrophy (pregnancy, fibroids),Prostate artery hypertrophy (BPH), Tumoral supply
ANEURYSM	True aneurysms (rare), Pseudoaneurysms secondary to trauma or infection
VASCULAR MALFORMATIONS	Arteriovenous malformations (AVMs), Pelvic hemangiomas

CONGENITAL



CORONA MORTIS

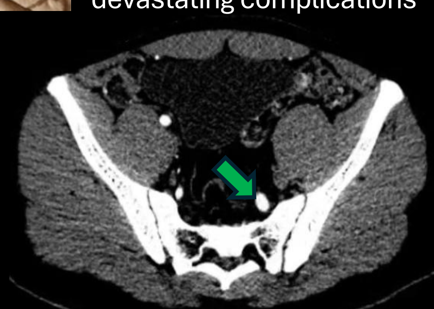
Aberrant vascular connection between the **external iliac/inferior epigastric artery** and the **obturator artery (Branch of anterior division of IIA).** Runs over the **superior pubic ramus.**

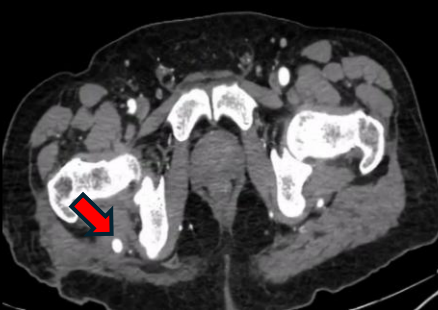
Prone to **iatrogenic injury** → hemorrhage. Preoperative identification is crucial to avoid devastating complications

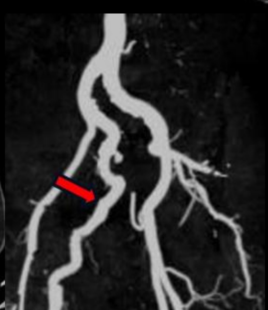
INTERNAL ILIAC ARTERY CONTINUATION AS FEMORAL ARTERY

Rare congenital anomaly in which the external iliac artery fails to develop

Blood flow is typically redirected through internal iliac artery or the persistent sciatic artery







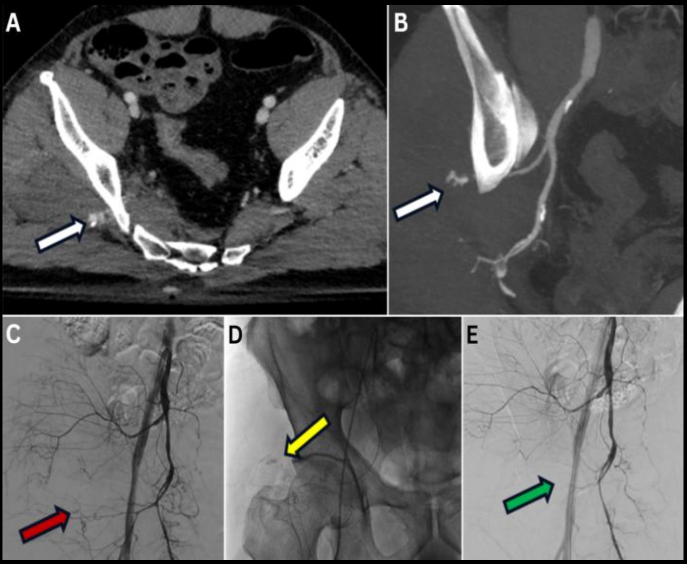
PERSISTENT SCIATIC ARTERY

Rare anomaly resulting from the persistence of the embryonic sciatic artery

Coexisting with or replacing the femoral artery.

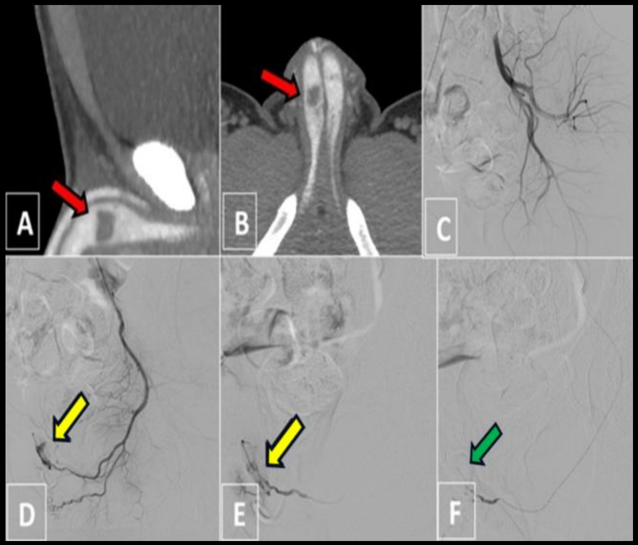
TRAUMA

POST-TRAUMATIC INFERIOR GLUTEAL ARTERY INJURY – GLUE EMBOLIZATION



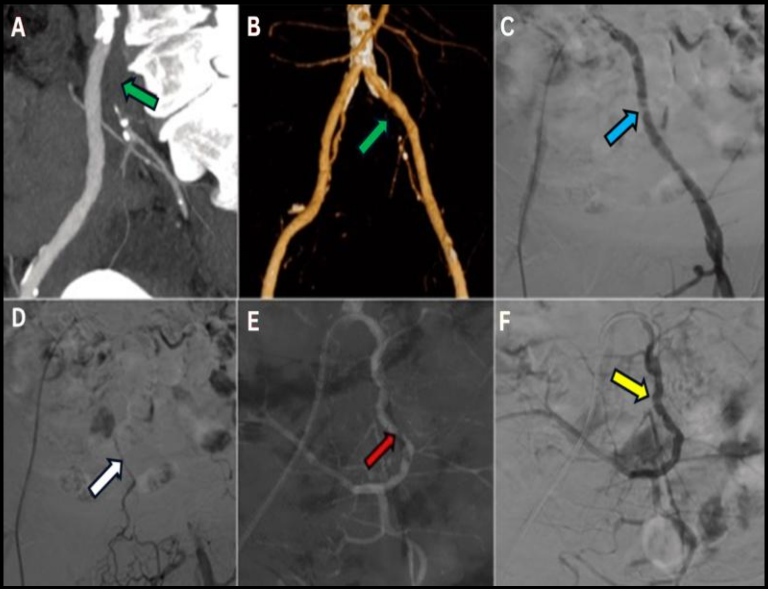
Figures A and B: AXIAL CT AND OBLIQUE MIP images demonstrate **active contrast extravasation** in right gluteal muscles from inferior gluteal artery.
Figure C: DSA demonstrates **contrast extravasation** originating from the inferior gluteal artery.
Figure D: DSA image depicts **glue cast** following embolization.
Figure E: POST-EMBOLIZATION DSA reveals successful embolization with complete **absence of contrast extravasation.**

POST-TRAUMATIC CAVERNOSAL ARTERY-CORPORA CAVERNOSA FISTULA – GEL FOAM EMBOLIZATION



Figures A and B: CECT IMAGES show **early contrast opacification** of the corpora cavernosa and dorsal vein of the penis
Figure C: DSA showing the left IIA
Figure D: DSA of the left internal pudendal artery shows **prominent left cavernosal artery with contrast blush in corpora cavernosa** - suggestive of fistula.
Figure E: DSA - Selective angiogram of the left cavernosal artery confirmed **fistula**.
Figure F: POST-EMBOLIZATION DSA shows **occlusion of the fistula**.

STENOSIS

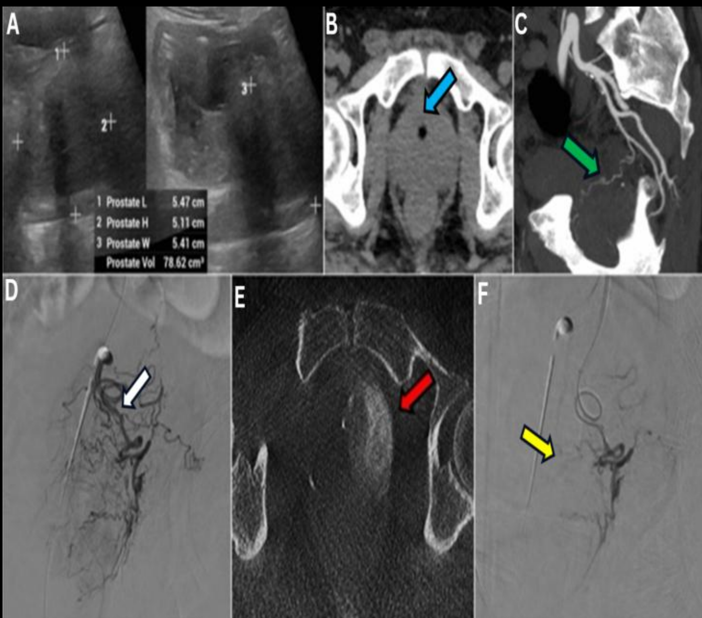


IIA OCCLUSION WITH GLUTEAL CLAUDICATION – BALLOON ANGIOPLASTY

Figures A and B: CT ANGIOGRAM OBLIQUE MIP AND 3D VR images show **occluded left IIA.**
Figure C: DSA shows normal flow in the **left EIA** with occluded left IIA
Figure D: DSA shows **filling of distal branches** of left IIA through profunda collaterals
Figure E: DSA shows **balloon angioplasty** of an IIA branch(red arrow)
Figure F: Post angioplasty DSA shows **good filling of the IIA branches**.

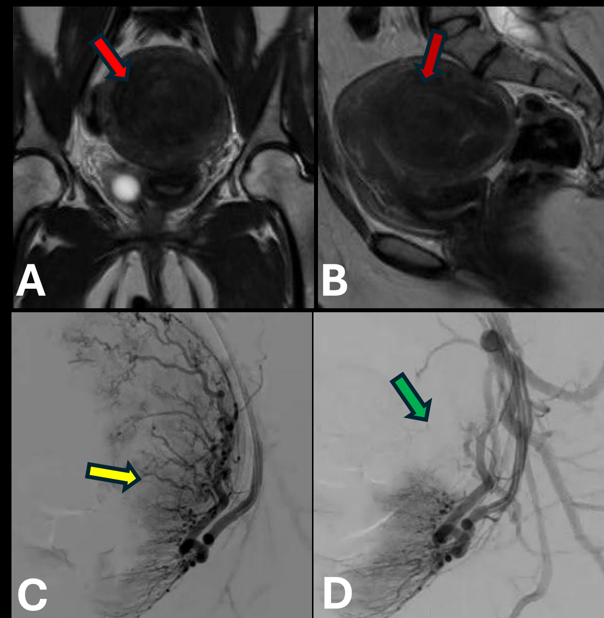
HYPERTROPHY

PROSTATE ARTERY EMBOLIZATION FOR BENIGN PROSTATIC HYPERTROPHY

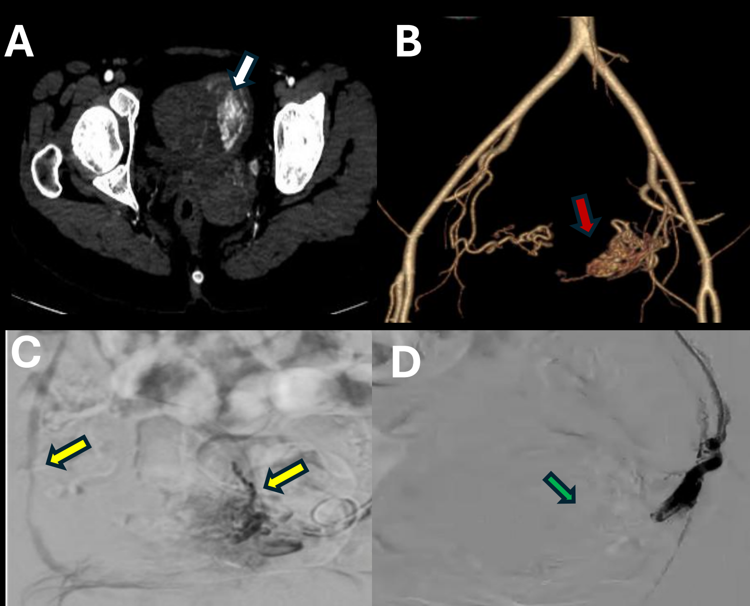


Figures A and B: US AND AXIAL CT images show **prostatomegaly.**
Figure C : CT ANGIOGRAPHY Oblique Sagittal MIP images show **hypertrophied prostatic artery**.
Figures D: DSA of prostatic artery shows **hypertrophied vessel** supplying enlarged prostate.
Figure E: CONE BEAM CT obtained during embolization shows **contrast blush in left half of prostate**.
Figure F: POST-EMBOLIZATION DSA shows occlusion of the prostatic artery with **no prostatic blush**.

UTERINE ARTERY EMBOLIZATION FOR MENORHAGIA DUE TO UTERINE FIBROID



Figures A and B: AXIAL and SAGITTAL T2-weighted MRI **d**emonstrate large **uterine fibroid**
Figure C: PRE-EMBOLIZATION DSA shows **hypertrophied uterine artery** with prominent vascular supply to the fibroid
Figure D: POST-EMBOLIZATION DSA shows successful **embolization with absent blush**



VASCULAR MALFORMATIONS

UTERINE AVM – EMBOLIZATION

Figure A: AXIAL CECT ABDOMEN shows multiple dilated and tortuous vessels in the uterus, consistent with **uterine AVM**
Figure B: CTA demonstrates **left uterine AVM**
Figure C: DSA shows abnormal vascular architecture with **dilated, tortuous vessels and shunting,** indicative of uterine AVM
Figure D: POST-EMBOLIZATION DSA shows **successful embolization** of the AVM

ANEURYSM

CLASSIFICATION:

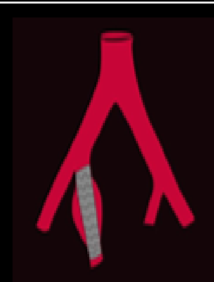
- **True Aneurysms -** Involve all layers of the vessel wall and are often degenerative.
- **Pseudoaneurysms -** Result from trauma or infection.

REVASCULARIZATION PROCEDURES

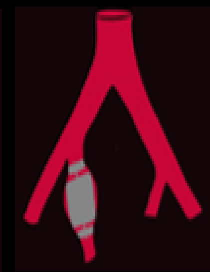
- Iliac Branch Device (IBD)
- Sandwich Technique
- Bell-Bottom Technique

MANAGEMENT TECHNIQUES:

Coiling
Induces thrombosis by blocking blood flow to the aneurysm.



Vascular plug
Effectively seals flow, reducing sac pressure and promoting thrombosis



Stent-grafting
Excludes the aneurysm sac while maintaining distal perfusion. Requires adequate proximal and distal landing zones.

EVAR WITH ILIAC BRANCH DEVICE FOR ABDOMINAL AORTIC AND ILIAC ARTERY ANEURYSM

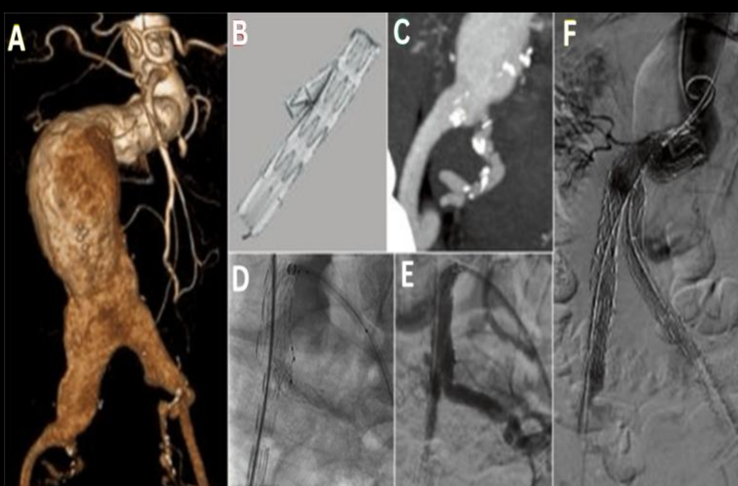
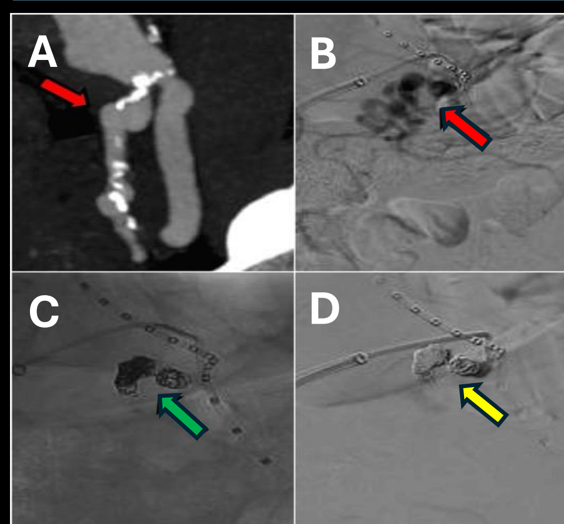


Figure A: CT ANGIOGRAM 3D VR image shows AA aneurysms with Bilateral iliac artery aneurysms
Figure B: Iliac branch device (IBD)
Figure C: CT ANGIOGRAM MIP Right IIA planned for IBD insertion
Figures D and E: DSA images demonstrate IBD deployment DSA
Figure F: POST EVAR and IBD deployment

COIL EMBOLIZATION FOR IIA ANEURYSM



Figures A and B: CT ANGIOGRAM MIP and DSA show left IIA aneurysm
Figure C: DSA showing **coil embolization**
Figure D: POST EMBOLIZATION DSA shows **absent opacification** of IIA aneurysm.

CONCLUSION

Advanced imaging and endovascular techniques are pivotal for accurate diagnosis and minimally invasive management of internal iliac artery pathologies, enabling safer interventions and improved patient outcomes.