



## ISOLATED ILIAC ARTERY ANEURYSM- 10 YEARS INSTITUTIONAL EXPERIENCE

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**ABSTRACT** **Objective:** To review the experience of our institution in repairing isolated iliac artery aneurysm (isolated IAA) in the last 10 years.

**Introduction:** Unlike abdominal and combined aortoiliac artery aneurysms, isolated iliac artery aneurysms (IIAAs) are uncommon. An isolated iliac artery aneurysm is defined as a twofold increase in the diameter of the iliac artery without a coexisting aneurysm at another location. IIAA was encountered infrequently in the past, comprising 0.9% to 4.7% of all intra-abdominal aneurysms according to a review of previous studies; however, in recent times, many asymptomatic IIAAs have been detected incidentally because of the widespread use of abdominal ultrasonography and computed tomography.

**Methods:** The medical records of patients who underwent isolated IAA repair at Institute of vascular sciences, MMC and RGGGH, Chennai, India, were reviewed, to obtain information on patients' demographics, vascular risk factors, type of treatment and outcome

**Results:** A total of 13 patients with 18 aneurysms, 11 men (84.6%) 2 women (15.4%), with a mean age of 58.1±6 years, and two paediatric patients of age 11 yrs (Female) and 3 months (Male) were treated. The mean diameter was 4.6±1.0 for non-ruptured at elective repair; 5.5±2.1 cm on the emergency cases. The majority of aneurysms were at the common iliac artery. All of them except one, underwent open repair. Ten (84%) had elective operations, and two (16%) emergency repair for ruptured aneurysm.

Hypertension and diabetes were seen as the most common risk factors with most of the patients were smokers. One was a known case of CKD and the paediatric female was a known case of RHD. There was one postoperative death in this series, patient succumbed on POD 1.

**Conclusion:** This case series reviews the literature with regard to the natural history, diagnostic workup, and treatment of iliac artery aneurysms. For patients undergoing elective repair, preoperative imaging with computed tomography or magnetic resonance is advocated. Repair is recommended for good-risk patients with aneurysms larger than 3.5 cm as there is high chances of rupture with increasing diameter.

**KEYWORDS :** Isolated iliac artery aneurysm, Open repair, Internal iliac-aneurysm

## INTRODUCTION

In contrast to abdominal aortic aneurysms and combined aortoiliac artery aneurysms, isolated aneurysms of the Iliac artery are uncommon, having an incidence of approximately 0.4-1.9%. (1-5) Its rarity justifies that its natural history and proper management is less defined compared with abdominal aortic aneurysms and stresses the importance of a better characterization of this pathology (6-7). In this way, the aim of this study is to review the experience of our institution in repairing isolated IAA in the last 10 years.

## Methods

Medical records of consecutive patients undergoing isolated IAA repair between January 2011 to December 2020 were reviewed. No pseudoaneurysms or mycotic aneurysms were included, and patients with aortic diameters >3.5 cm were excluded.

Isolated IAAs were defined as either single or multiple aneurysms located only within the common, internal, or external iliac arteries. Patient characteristics, comorbidities, as well as presentation and symptoms were reviewed.

Open surgical repair included aortoiliac reconstructions or iliac ligation.

**Definition of the variables:** arterial hypertension was defined as pressure values  $\geq 140/90$  mmHg or the need for anti-hypertensive drugs; smoking was considered current or previous smoking habits; diabetes mellitus as the need for specific drugs; chronic renal failure defined as serum creatinine >2 mg/dl.

Patients' demographics, pathologic characteristics of IAA, and treatment options were summarized and compared.

## RESULTS

From January 2012 to December 2020, we treated 13 patients with 18 Solitary Iliac Artery Aneurysms greater than 3 cm in diameter were studied.

Table 1. Gender Wise Distribution Of Cases

Total no. of cases	Male	Female
13	11 (84.6%)	2(15.4%)

Table 2. Symptoms At The Time Of Presentation

Pain	Pulsatile Mass	Non specific	Incidental
11(84.6%)	4(30.7%)	4(30.7%)	2(15%)

Table 2. Age Distribution

Mean age	Male	Female
58±6		67

Our study has only two female patients. Out of which; one rare paediatric case hence mean age not calculated.

Table 3. Comorbidities

SHTN	DM	Smoker	CKD	RHD
7(53.8%)	6(46%)	10(76.9%)	1(7%)	1(7%)

Table 3. Anatomical Segments Involved

CIA	IIA	EIA
11(84.6%)	2(15%)	2(15%)

Table 5. Site Of Involvement

Unilateral	Bilateral
8	5

Table 6. Average Size Of The Aneurysm At Presentation

Non-ruptured 4.6 ± 1.0
Ruptured 5.5±2.1

Table 7. Condition Of The Aneurysm On Radiology

Intact	Ruptured
11	3

Table 8. Surgical Treatment Given

ABF	AIB- synthetic	Aneurysm ligation	No intervention
5	6	2	1

Table 9. Aetiology Behind IIA

Atherosclerotic	Inflammatory	Non specific

10	2	1
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12 patients with 16 SIAAs (Solitary Iliac Artery Aneurysms) were treated by open surgical repair. 1 patient died pre-operatively whereas 1 patient died on Post-op day 1.

The immediate technical success and early patency rates were 100%. The majority of isolated IAA surgical procedures, performed in five patients, all with simultaneous occlusive disease at the aortoiliac territories, consisted in midline transperitoneal approach and an aorto-bifemoral bypass with Dacron graft (3 patients treated with a graft of 14x7 mm and two patients with 16x8 mm). Four of these patients had an aneurysm at the common iliac artery involving external iliac artery which was treated with Aorto-iliac bypass using PTFE 7x40 mm graft. Five patients with aneurysm of CIA alone underwent Aorto iliac bypass using PTFE 7x40 mm graft. One rare case of 3 month old male and another 11 years old paediatric patients with bilateral CIA aneurysm underwent Aorto bi-iliac bypass using Lt superficial femoral vein. (11) Two patients had bilateral internal IAA, and they were treated with Aneurysm exclusion by ligation.

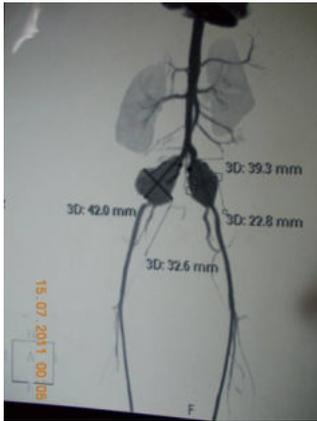


Fig 1. CT Angio of 3 months old male child.

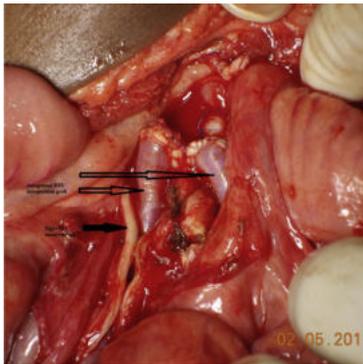


Fig 2. Intra- op pic post reconstruction of the same 3 month old patient.

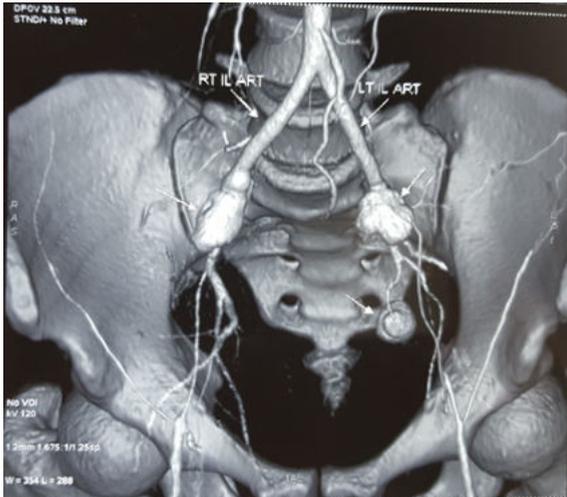


Fig 3. CT angio pic of patient with bilateral CIA aneurysm with distal occlusion.



Fig 4. CT angio pic of patient who presented with ruptured Iliac artery aneurysm

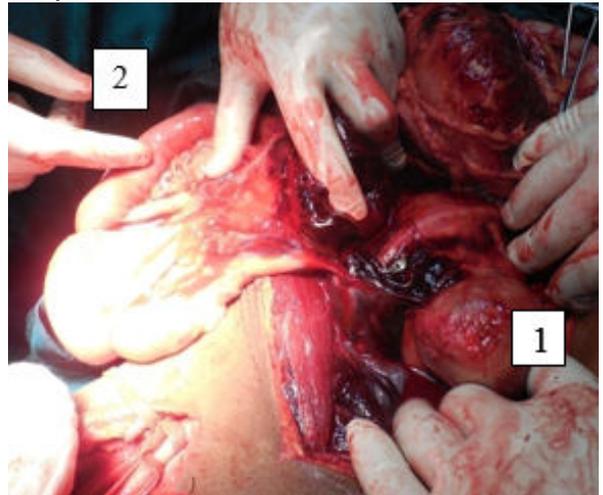


Fig 5. Intra op pic of ruptured Iliac artery aneurysm. 1. Ruptured Aneurysm 2. Cranial end of the patient

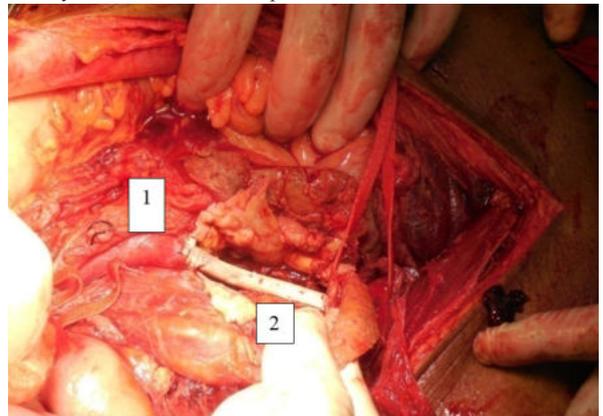


Fig 6. Intra op pic post Aorto-iliac repair with PTFE interposition graft. 1. Aorta 2. PTFE graft

**Postoperative Data**

The mean postoperative length of stay was 8.0±3.6 days. Major operative (30 days) complications included one respiratory infection and one wound femoral incision infection. There was one perioperative deaths in this study. The patient was operated in Emergency for ruptured aneurysm and had presented to us in shock.

**DISCUSSION**

Although iliac artery aneurysms represent a relatively unusual form of intra-abdominal aneurysm, they pose a unique challenge as traditional open surgical management has been hampered by a relatively high morbidity and mortality. (12) The management of iliac artery aneurysm is complicated by the technical challenge of operating deep within the pelvis as well as the uncertain consequence of compromising internal iliac flow to one or both vessels.

However, limited by its dimension, its retrospective nature, and the impossibility to draw statistical conclusions, we believe that this study could contribute to improve the characterization of isolated IIA.

#### Patient characteristics:

Comparing the results of this series with those published in the literature, we noticed similar sex distribution i.e. 5:1. (8,9,10).

Earlier reports on iliac aneurysms cited a relatively high percentage of symptomatic presentation.(13) In other studies (12) only a minority of patients presented with symptoms. They concluded that it was due to the increased number of aneurysms that are incidentally discovered on imaging. Whereas in present study majority of the patient presented with some symptoms arising out of aneurysm. This may in part be due to the majority of our representative population belong to lower socioeconomic strata and have limited access to frequent imaging.

Similar to other reports, the majority of the patients in this series were males whereas we noticed the presentation at an early age as compared to western literature which found their mean age at presentation in 70s.(14)

Analysing the vascular risk factors, it was noted that hypertension was the most prevalent 7(53.8%) with 6 (46%) having associated diabetes mellitus. Most of the patients were or had been smokers. The data is comparable with previous studies(20) with DM relatively more common. This may be a probable explanation of relatively early age of presentation in our series as compared to the available literature.

The anatomic distribution of aneurysms treated in this series mirror those that are historically described: 70% in the common iliac, 20% in the internal iliac, and 10% in the external iliac.(17)

The mean diameter of symptomatic IIAA is 4.5 to 8.5 cm [18,19]. Our study has similar findings in angiographic study with average size at presentation being 4.6 cm.

The true incidence of rupture and its correlation to size is unclear, with previous series reporting rupture rates ranging from 14% to 70%. (14,15,16). In our series 23% of patient presented with ruptured aneurysm.

The causes of IIAA are atherosclerosis, infection, trauma and disorders of the arterial wall. The majority of cases are related to progressive atherosclerosis.(10) We also found that atherosclerotic was the most common diagnosis in our series. The histopathologic examination of the aneurysm sac in 3 months old male child revealed features of a true aneurysm with calcification and no evidence of vasculitis. (11). Two male patient aged 45 years and 50 years respectively had raised inflammatory markers (ESR/CRP) and findings in CT Angio were suggestive of vasculitis.

McCready et al demonstrated a mean aneurysm growth rate of 4 mm per year that is similar to AAA growth.(15) The mortality rate in their series was 15%. In a collective series of 367 open iliac aneurysm repairs,(13) the emergency mortality was 40% whereas elective mortality was only 7%, again emphasizing the importance of early recognition and repair. In our series, 50% patients who presented with rupture died after open repair.

While patients treated with endovascular exclusion had statistically similar rates of complications, there were certainly trends that would suggest a decreased risk of renal failure, cardiovascular compromise, infections, DVTs, and death in the endovascular group.(12). Due to logistic issues we don't have any experience in endovascular management of Iliac artery aneurysm.

#### CONCLUSION:

Perhaps it is reasonable to readdress the conventional approach of waiting until the iliac aneurysm exceeds 3 cm to repair it. Once the size criteria is met or in symptomatic patients with rapidly expanding aneurysm, emergent management should be sought. Late presentation and ruptured aneurysm at the time of presentation are associated with poor outcome. Endovascular repair is a safe and minimally invasive alternative to open repair and seems to be associated with fewer complications and a shorter length of stay in these patients.

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