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The 100-Year Evolution of the Isolated Internal Iliac Artery Aneurysm

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Background: Isolated internal iliac artery aneurysms (IIIAA) are a rare form of aneurysm. The incidence increases with age, and the prevalence is higher in men. The clinical presentation can vary, and standard treatment protocols are not established. The first case of an IIIAA was described more than 100 years ago. The purpose of the study is to summarize the various clinical presentations and treatment options that have been reported in the literature in the past 100 years.

Methods: Literature about IIIAA was reviewed using the electronic databank PubMed. All case reports and case series were analyzed, and we included our own data with 2 case reports.

Results: Over time, IIIAA diagnosis increasingly resulted from asymptomatic incidental findings on radiologic studies. Various clinical presentations included abdominal pain, back pain, rectal bleeding, hydronephrosis with renal failure, hematuria, and free rupture with shock. Rupture has a mortality rate of 53%. IIIAAs were more common on the left (61.8% left, 27.3% right, 10.9% bilateral). Treatments include open surgical repair and endovascular repair using a variety of methods. One article reported a hybrid method using both endovascular and open surgical technique.

Conclusions: Since its first description 100 years ago, we have gained knowledge about the natural history of IIIAA. Multiple treatment options have been described, but long-term outcome needs further investigation.

INTRODUCTION

Iliac artery aneurysms most often coexist with aortic aneurysms. It is well established that the prevalence of aortic aneurysms increases with age and that men are more commonly affected. The Tromsø study showed a prevalence of 86% in men aged 75 to 84 years. In 10 to 20% of aortic aneurysms, the iliac arteries are involved.[1]

In contrast, isolated iliac artery aneurysms are rare, and an isolated internal iliac artery aneurysm (IIIAA) is particularly rare. Most of the knowledge about its incidence and prevalence is obtained from case series and autopsy data. The estimated incidence of IIIAA is 0.3% to 0.5% of all intra-abdominal aneurysms.[2,3] In 85% of the cases, an IIIAA is unilateral.[4–7] Predominance of a particular side has not yet emerged.

More than 100 years ago, Archibald MacLaren was the first surgeon to describe a case of an IIIAA.[8] Since then there have been 52 reported cases of IIIAA.

Numerous case reports and case series describe a variety of clinical presentations in patients with IIIAA. Symptoms include but are not limited to local pain, gastrointestinal, genitourinary, and neurologic findings.[9,10] To our knowledge, data about the frequency of the various clinical presentations has not been published.

A standard treatment for IIIAA has not been established. Likewise a relation between size and rupture risk has not been shown. A high rupture

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rate of 67% with conservative management alone was shown by Brin and Busuttil.[11] The high mortality rate that is associated with rupture warrants interventional or operative treatment.[12] McCready et al. suggested repair for all IIIAAs >3 cm.[13]

For decades, the mainstay of any IIIAA repair was open surgical technique. The mortality in open surgical repair is as high as 10%, and the surgery is technically challenging.[14] A rapid improvement in endovascular techniques over the past 20 years has created new treatment options for patients with aneurysms, including those with IIIAA. To the best of our knowledge, studies that compare open surgical treatment with endovascular treatment only exist for isolated iliac artery aneurysms, not specifically for IIIAAs.

The purpose of this article is to analyze the frequency of various clinical presentations in patients with IIIAA. An investigation of a correlation between size of the aneurysm, occurrence of symptoms, and rupture risk may help establish treatment recommendations. We summarize different open surgical methods, endovascular methods, and hybrid methods that have been described in the literature over the past 100 years. In addition, we present a case series of successful endovascular treatment in 2 patients with IIIAA.

METHODS

A literature search was conducted using the Internet-based search engine PubMed. The keyword ''isolated internal iliac artery aneurysm'' was used to search for appropriate articles. The references of the selected articles were used as a guide to search additional articles not identified by the initial search. All publications that dealt with the clinical presentation and treatment of IIIAA were systematically reviewed. Articles about internal iliac artery aneurysms in coexistence with aortic and common iliac aneurysms or subsequent to surgery for abdominal aortic aneurysms were excluded. Articles were limited to those written in English or German.

Patient data from all applicable case reports or case series were entered into a Microsoft Excel 2011 spreadsheet for analysis. In addition, we included the present data of our case series of successful endovascular treatment in 2 patients with IIIAA.

Patients were classified into 3 groups. Group I included asymptomatic patients who had an IIIAA incidentally diagnosed during the investigation of unrelated health problems or during routine physical examination. Patients in this group underwent early elective surgery. In group II were patients who presented with a variety of symptoms. Their diagnostic workup revealed an IIIAA without free rupture. These patients were hemodynamically stable, and the indication for surgical repair was urgent. Group III included all patients who presented with a free rupture of an IIIAA. Emergency surgery was indicated for patients in this group.

The patient data that were collected included age and gender, presenting symptom, size and side of the aneurysm, type of surgery (open vs endovascular repair) and survival. In addition, the presence or absence of documented abdominal pain, a palpable abdominal or rectal mass, hydronephrosis, urinary habit changes, hematuria, blood per rectum (BPR), constipation, lumbar pain, radiculopathy, extremity symptoms, and thrombophlebitis or DVT were systematically checked in each article. Urinary habit changes included urinary retention, urinary tract infections, nocturia, and dysuria. Extremity symptoms included claudication, edema, cyanosis, pain, and weakness.

Case 1

A 92-year-old male Caucasian was admitted by our institution's medicine department with right-sided chest pain and dyspnea. An initial workup included a chest x-ray and was inconclusive in regard to the right-sided chest pain. A subsequent computed tomography (CT) scan of the chest showed a small pleural effusion on the left. An additional finding was a dilated left renal collecting system. A CT scan of the abdomen and pelvis without contrast was conducted and showed left-sided hydronephrosis caused by a 4-cm mass that was suspected to be the left internal iliac artery. The patient had no genitourinary symptoms, and renal function was within normal limits. A CT angiogram of the abdomen and pelvis was done to further assess the mass and confirmed the presence of an eccentric 4.5-cm proximal left IIIAA. The patient's past medical history included CHF with an ejection fraction of 20% and a history of coronary artery bypass graft surgery. Because he was a poor surgical candidate, we offered endovascular repair of the left IIIAA.

The right femoral artery was chosen for access. An angiogram showed complete patency of the right common, external, and internal iliac arteries. The proximal and the distal neck of the left IIIAA were identified. Its size was 5.5 cm. A 12-mm and a 14-mm Amplatzer plug were deployed successfully. The patient had no complications and was