Optimal surveillance and treatment of renal and splenic artery aneurysms

ABSTRACT

Aneurysms of the renal artery and splenic artery are uncommon but clinically important, as they pose a risk of rupture with a high fatality rate. Indications for surgical or endovascular repair are based on aneurysm location and risk factors for rupture, such as aneurysm size, growth, and associated conditions, while medical management is also important. Regular surveillance with imaging is critical before and after intervention to guide treatment.

KEY POINTS

Renal and splenic artery aneurysms are often detected incidentally but can present acutely with dissection, rupture, or both, which are associated with high risk of death and morbidities.

Computed tomographic and magnetic resonance angiography are key to diagnosing and characterizing the aneurysm and the remaining vasculature, while ultrasonography helps in assessment and surveillance. Catheter angiography is the gold standard for diagnosis and allows the opportunity for intervention.

The individual’s risk for rupture or dissection determines the need for prophylactic intervention and is based on aneurysm size, location, growth, and other associated conditions and risk factors.

Management strategies include open and laparoscopic surgery and endovascular procedures. Regular imaging surveillance is critical after both diagnosis and interventions.

Although aneurysms of the abdominal and thoracic aorta are more common, visceral aneurysms such as those of the renal artery and splenic artery can also form.

In a previous article, we discussed the optimal surveillance strategies and treatment for aneurysm of the thoracic aorta. Here, we address the diagnosis, surveillance, and treatment of renal artery and splenic artery aneurysms.

RENAL ARTERY ANEURYSM

What is the clinical importance of renal artery aneurysm?

Renal artery aneurysms are rare, found in about 0.1% of the population in autopsy studies, although significantly more in cross-sectional imaging or angiography studies. They are categorized by location and morphology into 3 types (Figure 1), with important management implications:

- Type 1—saccular aneurysm from the main renal artery or large segmental branch
- Type 2—fusiform aneurysm
- Type 3—intralobar artery aneurysm.

Renal artery aneurysms often present in the sixth decade. Up to 90% of patients have hypertension, and a minority have arterial aneurysms elsewhere. Most younger patients with renal artery aneurysms are women, and about two-thirds have fibromuscular dysplasia.

Symptoms are rare but can include hypertensive crisis, shock, hematuria, flank and abdominal pain, and urinary obstruction, with signs of a palpable abdominal mass and a renal bruit. The natural history is slow growth at 0.06 to 0.09 mm per year. The clinical concern is rupture, which occurs in 3% to 5%, with mortality rates near 10%, although these figures are lower than with other types of visceral aneurysms.
How is renal artery aneurysm assessed?
Renal artery aneurysms are often diagnosed incidentally either during investigation of resistant hypertension or during angiography for another indication. They are detected more often now than in the past because of improvements in imaging. Blood pressure and renal function should be routinely assessed. Accurate measurement is important, as size is directly associated with risk of rupture and need for intervention. Circumferential calcification may be protective. Duplex ultrasonography is the least expensive imaging modality. Further, it does not expose the patient to radiation, and it can show a dilated vessel with turbulent flow. On the other hand, it has the lowest sensitivity and specificity, and its accuracy depends on operator experience and the patient’s body habitus. Multidetector computed tomographic angiography (CTA) is the most commonly used modality for assessing renal artery aneurysms. Its superior resolution can characterize anatomy using multiplanar reconstructions and volume-rendered imaging (Figure 2). On the negative side, it entails the use of nephrotoxic contrast media and radiation exposure. Magnetic resonance angiography (MRA) has become an alternative to CTA, with comparable accuracy and without radiation, but it is less available and costs more.

How should renal artery aneurysm be treated?
There are no guidelines for treatment of renal artery aneurysm, and if the aneurysm has not ruptured, indications for prophylactic surgery are based on rupture risk. These include any of the following:
- Large size (> 2 cm)
- Symptoms
- Refractory hypertension with significant renal artery stenosis or thromboembolism
- Childbearing age, for women.

The two main intervention options are surgical and endovascular repair. Acute rupture calls for emergency surgical repair of the aneurysm with renal artery reconstruction or with nephrectomy if the kidneys are not salvageable. For elective management, surgical primary repair or endovascular repair with stents or coil occlusions can be performed for type 1 aneurysm; surgical reconstruction with a vein graft or aortorenal bypass graft typically for type 2 aneurysm; and embolization coils for type 3 aneurysm, with renal preservation whenever possible.

Mortality rates during elective interventions have been less than 5% in recent studies, but up to 50% in pregnancy. Surgical complications include occlusion of the renal artery, branch, or graft; renal ischemia; and cardiac events. Endovascular complications include failed procedure (< 10%), thrombosis, embolization, and postembolization syndrome. “Postembolization syndrome” refers to a constellation of symptoms including abdominal pain, fever, and at times ileus and pancreatitis that occur in up to 30% of patients after ab-
Overall, outcomes have improved significantly over time with earlier detection and better planning and interventional techniques.2,4

**SPLENIC ARTERY ANEURYSM**

What is the clinical importance of splenic artery aneurysm?
The prevalence of splenic artery aneurysm is 0.04% to 0.10% at arteriography and autopsy. It is often found incidentally, but accounts for about 60% of visceral arterial aneurysms.12

The main risk factors or causes include portal hypertension, liver transplant, pregnancy, pancreatitis, atherosclerosis, hypertension, connective tissue disease (eg, Marfan syndrome), vasculitis, endocarditis, fibromuscular dysplasia, trauma, congenital anomalies, infection, older age, and female sex (especially multiparous women).11,12

Symptoms occur in up to 20% of cases and include upper abdominal pain that can radiate to the shoulder, nausea, vomiting, anorexia, and gastrointestinal bleeding. Rupture presents with acute abdomen, peritoneal bleeding, and shock.12,13 The risk of rupture is 2% to 10%, with a mortality rate of 25%, and both figures are markedly higher in pregnancy.12,14

How should splenic artery aneurysm be evaluated?
Abdominal radiographs rarely detect splenic artery aneurysm. Ultrasonography has some utility as an accessible, low-cost, and radi-
RENAL AND SPLENIC ARTERY ANEURYSMS

Aneurysms of the splenic and pancreatic arteries are not well-recognized conditions in the medical community, despite their clinical significance. They can cause severe complications, such as rupture, ischemia, and infarction. Therefore, early detection and management are crucial. This article reviews the management of splenic artery aneurysms (SAA) and pancreaticoduodenal arterial aneurysms (PDA). It discusses the current treatment options, including endovascular and surgical approaches, and highlights the importance of follow-up imaging to monitor the progression of the aneurysms.

The treatment options for splenic artery aneurysms include endovascular treatment and open surgery. The choice of treatment depends on several factors, such as the size and location of the aneurysm, the patient’s age and comorbidities, and the presence of symptoms.

Endovascular treatment is preferred in many cases, as it is less invasive and associated with fewer complications compared to open surgery. The procedure usually involves the placement of a stent or stent-graft to exclude the aneurysm from the circulation. However, the choice of treatment should be individualized based on the specific characteristics of the aneurysm.

Open surgical treatment, which involves resection of the aneurysm and repair of the artery, is reserved for cases where endovascular treatment is not feasible or contraindicated. It is associated with a higher risk of complications, including bleeding, infection, and mortality.

Follow-up imaging is crucial to monitor the aneurysms and assess their response to treatment. It is recommended to perform regular imaging at 6 months after diagnosis and then annually. This helps to detect any growth or complications and adjust the treatment accordingly.

In summary, the management of splenic artery aneurysms requires a multidisciplinary approach, taking into account the specific characteristics of the aneurysm and the patient’s medical condition. Early detection and appropriate treatment can prevent serious complications and improve patient outcomes.

REFERENCES


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