Post-endovascular aneurysm repair (EVAR) testicular ischemia: A rare complication

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Introduction

Endovascular aneurysm repair (EVAR) of abdominal aortic aneurysms (AAA) is now the standard of care for infrarenal AAAs based on lower morbidity and mortality compared to open surgery. The evolving endovascular techniques have made more patients eligible for this less invasive repair. Complications of both open and endovascular techniques are important to understand for vascular surgeons, as well as other specialists evaluating these patients. We report on a patient who underwent EVAR of an infrarenal AAA, and suffered from testicular ischemia in the postoperative period.

Case presentation

A 68 year old male was found to have a 5.8 cm infrarenal AAA which was incidentally detected and confirmed with CTA imaging (Fig. 1). He met anatomic criteria for stent grafting and underwent successful endovascular repair with a Gore excluder stent graft (Fig. 2) with no endoleaks noted at completion. One day after the procedure, the patient experienced abdominal pain and bloody diarrhea. Abdominal CT confirmed left colonic ischemia and a Type 1b endoleak from the right iliac limb which was perfusing his inferior mesenteric artery (IMA). On post op day 2, the patient began to experience severe left sided testicular pain. The pain radiated to the groin, and was associated with sudden swelling of his left testicle. There was no associated flank pain, dysuria, voiding dysfunction, or fever. The patient had a history of benign prostatic hypertrophy and erectile dysfunction, but no other history of urologic problems. His surgical history included EVAR, bilateral inguinal hernia repair, multiple orthopedic procedures, appendectomy, and vasectomy.

Physical examination revealed a normal appearing right testicle and scrotum. Inspection of the left testicle revealed a hydrocele. The left testicle was palpable, and was extremely tender with slight induration. The epididymis was slightly tender and indurated. The spermatic cord was thickened, but no torsion could be appreciated. The remainder of the physical exam was normal. Emergent testicular ultrasound revealed no blood flow to the left testicle, but adequate flow to the right (Fig. 3).

These findings suggested either an embolic phenomenon related to the recent EVAR, or, less likely, a testicular torsion. The findings were explained to the patient, who had no concerns for future fertility, and underwent operative exploration. Intraoperative examination revealed a completely infarcted left testicle and epididymis. No torsion was noted. A left orchiectomy was performed. A right orchiopexy was performed to maximally protect the right testicle. One week after the orchiectomy, the patient had an open repair of the infrarenal AAA with explantation of the stent graft, placement of a bifurcated dacron graft with reimplantation of the IMA as it was felt that the endoleak was perfusing his IMA.
allowing for resolution of his colonic ischemia. The patient did well postoperatively and was discharged home without further complications.

Discussion

EVAR is a procedure that is becoming more common. One study estimated that 74% of AAA repairs performed in 2010 were performed using EVAR. Common complications of EVAR include: endoleak, bleeding, infection, contrast related injuries, and ischemia. Ischemic complications range from intermittent claudication to ischemic necrosis requiring amputation. Testicular ischemia is a rarely reported complication with only three reported cases in the literature. One case report from 2010 reported testicular ischemia, for which the patient underwent orchiectomy. Another case report from 2014 reported testicular ischemia following EVAR which was managed conservatively with symptom control, after which the patient recovered. The mechanism of testicular ischemia following EVAR is not known. Current theories include thromboembolic events, absence of collateral blood flow, delayed occlusion of testicular arteries, or graft migration as possible causes. The onset of testicular pain in previous studies has ranged from two days to six weeks after surgery. Additionally, the presenting symptoms included groin pain, flank pain, and/or testicular pain. Therefore, in patients who have undergone a recent EVAR who present with flank pain, groin pain, or testicular pain, a high index of suspicion should be maintained for testicular ischemia. Because this is a relatively rare diagnosis, there is not a large body of literature to guide management. There are no known risk factors for this complication. Surgery is an option if the loss of the testicle is not of concern to the patient. If conservative management is attempted, one potential complication is reperfusion injury to the ischemic testicle. This injury has been studied in multiple animal experiments, and reduced rates of reperfusion injury has been documented using several treatment modalities, including morphine administration and therapeutic hypothermia. Several other studies have identified other potential treatment modalities using animal models. No clinical trials of these modalities has been attempted in humans, but they may be options for treatment in the future. The decision for surgery must be made while balancing the potential risks of reperfusion injury and the potential risks of scrotal exploration.

One study documented a complication rate in EVAR of 17%. In reviewing our case, we assumed the patient had microembolization into his left hypogastric artery. This caused both transient colonic ischemia and left testicular ischemia. We believe the Type 1b endoleak allowed antegrade perfusion of his IMA thus reversing his colonic ischemia. This added complexity to our treatment options to fully exclude his AAA. Secondary options to successfully treat his Type 1b endoleak included placement of an iliac branch device with extension into the external iliac artery and explantation of the stent graft with IMA reimplantation. We choose the latter to avoid recurrent embolic phenomenon to either hypogastric artery and to allow IMA perfusion.

Conclusion

No defined treatment exists for post-EVAR testicular ischemia, but case reports have demonstrated success with both orchiectomy and supportive treatment depending on the amount of blood flow that the affected testicle is receiving. No role has been defined for treatment of reperfusion injury if conservative management is attempted. Additionally, no role has been defined for orchiopexy to protect the unaffected testicle. The best approach will likely depend
on some combination of severity of presenting symptoms, the amount of blood flow demonstrated by ultrasonography, and patient preferences regarding care. Management of this complication may become more important if the number of EVAR procedures increases in light of the new screening recommendations put forth by the USPSTF.

Consent

Appropriate consents were obtained to present this case report.

Conflicts of interest

None.

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Figure 3. Bilateral testicular ultrasound showing normal perfusion of the right testicle and no perfusion of the left testicle.