

CASE REPORT

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Surgical Repair of Abdominal Aortic Aneurysm in Patients with Simultaneous Urological Disorders: a Single Center Experience

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ABSTRACT

Introduction: Although rare, co-existence of abdominal aortic aneurysms with urological manifestations, suggests a challenging surgical entity in terms of successful aneurysmal repair along with minimally or null urological complications. **Case reports:** There are neither available data regarding the incidence of their co-existence nor consensus regarding optimal surgical management. Given the infrequency of their simultaneous presentation, the report of unusual cases as well as proposal for successful surgical management, are always useful and educative. **Conclusion:** Precise imaging pre-operatively and meticulous surgical technique intra-operatively are of utmost importance and suggest our vast allies in successful outcomes. Herein, we present our small case series of 3 interesting cases.

Keywords: Abdominal aortic aneurysm, aneurysmal repair, urological manifestations.

1. INTRODUCTION

Abdominal aortic aneurysm (AAA) is a vascular abnormality affecting relatively older patients (1). The incidence of AAAs is between 2% and 8% in men over the age of 65 and occur four times more often in men than women, while their occurrence varies by ethnicity (1). Although AAAs are known from the ancient years and attempts for surgical repair were devastating, it was Matas in 1923 who performed the first successful aortic ligation on a human (2) and Albert Einstein with his operation by Nissen in 1949 who popularized AAA as a clinical and surgical entity. Apart from very odd cases where an AAA co-exists with urological manifestations (3), there are several reports of simultaneous existence and treatment of AAAs and benign and malignant urological disorders, albeit there are neither available data regarding the incidence of their co-existence nor consensus regarding optimal surgical management. The relative literature consists of retrospective small case series and case reports describing mainly single centers' experience, thus not uniformly designed and grossly underpowered in a «guide-line» basis. Herein, we report our experience of three cases of AAA and simultaneous urological disorders.

2. GENERAL CONSIDERATIONS

In this relatively small series of patients, our main goal was to offer a definite surgical repair of the life threatening situation caused by the AAA. However, given the fact that the co-existence of difficult benign urological disorders could easily incommode and complex aneurysm repair and further increase morbidity, it was of utmost importance to be well prepared pre-operatively with precise imaging and careful evaluation regarding cardiology and respiratory issues. This accurate pre-operative evaluation is routinely performed in our department, resulting in least intra- and post-operative complications.

In general all patients undergoing AAA repair receive general endotracheal anaesthesia and undergo midline laparotomy from the xiphoid process to the pubic symphysis. Preoperative antibiotics are administered approximately 2 hours before incision.

Current surgical strategy is much more straightforward, at least in many of the cases that in the past would be classified as difficult to proceed or of a high surgical risk. Certainly, there will always be unexpected surgically difficult cases. However, contemporary imaging studies carry so much information

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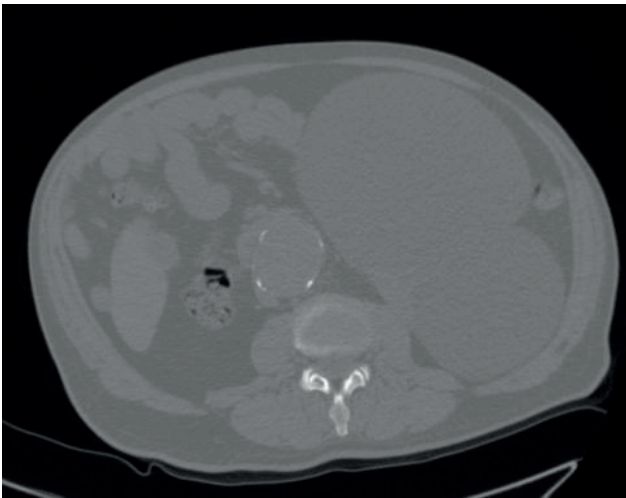


Figure 1. A 5.5 cm AAA in close relation with a 17 cm left renal cyst (one out of many).

that the surgical path is often dictated in a clear way. Contrast enhanced computed tomography scanning, in particular with thin slices, is of a great value in aortic surgery; in our cases presented here it helped to mark an ideal surgical route in order to avoid further damage during the preparation of the surgical field for the repair of the aneurysmal aorta.

Case Report 1

A 62 year old male, presented with a 5.5 cm AAA and immense left renal cysts with average diameter of 17 cm. Preoperative CT scanning helped us in identifying the anatomic borders of the cysts (Figure 1). Preoperative consultation with the urologist clarified the relatively minimal risk of hemorrhage in case of the accidental cystic rupture, however the main concern in this case would be rather the soaking of the AAA bed or in worse case scenario of the synthetic graft. Furthermore, although very rare, the possibility of septic cystic content could not be excluded easily preoperatively. The possibility of opening the cyst after celiotomy, in order to evacuate it and then over-suture the cystic wall, was early abandoned given the aforementioned urological considerations. In the operation room, following meticulous technique, we first entered in the retroperitoneal space just before the aortic bifurcation, as the cysts were more expanded in high up the abdomen. Following the lower initial incision of the peritoneum, iliac arteries were exposed and a cephalic route was followed. Gentle retraction with covered retractors assisted in detaching the peritoneum and exposing the aorta till the left renal vein. Typical repair of the aorta with a polyester tube graft was executed without incidental or intended opening of the cysts.

Case Report 2

A 64 year old male, presented with a 5.5 cm AAA. He reported a radical cystectomy with double-barrel cutaneous ureterostomies due to muscle-invasive bladder cancer two years ago. The main issues, since it was a more complexed case, were the risk of infection due to the proximity of the double-barrel right ureterostomies and the trajectory of the left ureteral catheter which seemed in the preoperative imaging studies that was in

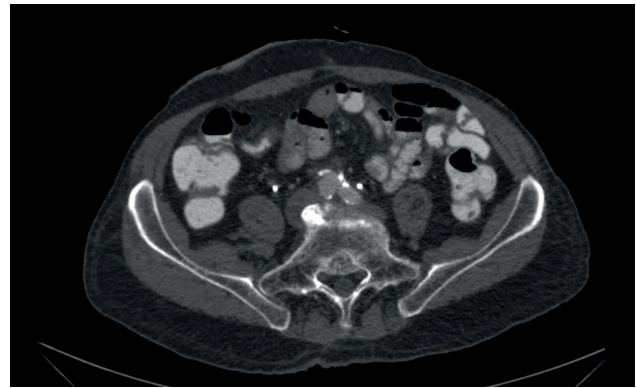


Figure 2. Left ureteral catheter in close proximity to the aortic bifurcation.

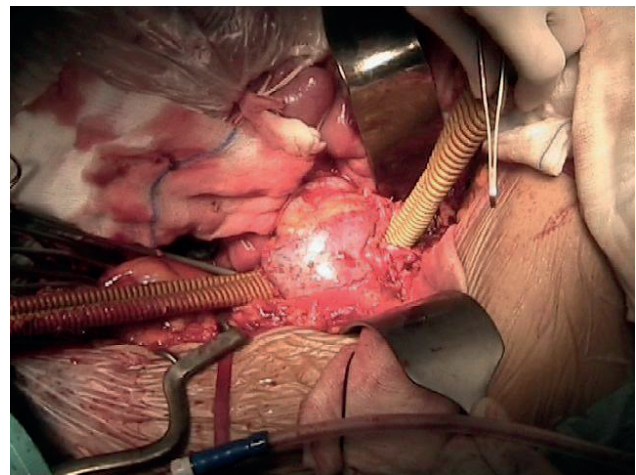


Figure 3. "Endovascular-like" AAA repair with tube graft slipped in the aneurysmal aorta.

close proximity to the aortic bifurcation (Figure 2). Thus, an increased infection risk was obvious as well as the risk of an accidental injury to the left ureter; both situations could be real disasters due to the use of a synthetic graft for the repair of the aorta. At first, a sterile adhesive surgical drape covered the area of the midline incision and then the ureterostomies area was fully exposed and following thorough scrubbing a new appliance sac was used, scrubbed and a sterile adhesive excluded the stoma area. Then the midline drape was removed and regular scrubbing followed, including scrubbing of the stoma covering the drape. Further regular application of surgical drapes took place. Following the midline laparotomy, mobilization of the duo-denum was performed detaching the ligament of Treitz and proximal exposure of the aorta was initiated towards the aortic bifurcation. The left ureteral catheter was pal-pated crossing the bifurcation and was apposed meticulously and iliac clamps were slipped under peritoneum, following proximal aortic cross-clamping. Finally, a polyester tube graft was placed.

Case Report 3

A 49 year old male presented with a 6 cm AAA and horseshoe kidney. In this case, the procedure was performed in the usual way of treating AAAs; the only difference in that case was that we avoided the separation of the horseshoe kidney, and also no attempt was carried in order to detach the isthmus of the horseshoe kidney

from the aortic wall. We prepared the aorta above and below isthmus and following intrave-nous (iv) heparination, cross-clamping of the aorta and the iliac arteries was performed. The aorta above and below the isthmus was opened and the aortic wall in ad-herence with the isthmus was elevated. Following minimal bleeding control inside the aortic wall, we slipped the tube graft like an endovascular graft inside the aortic wall. The proximal part of the graft was anastomosed just below the proximal aortic clamp and the distal part of the graft was anastomosed with the distal aorta just above the bifurcation (Figure 3). Both anastomoses and the residual exposed graft was covered by the remaining aortic wall. That way any vascular or parenchymal damage was avoided due to the intact isthmus and to the best of our knowledge, it is the first re-ported case in the literature with “endovascular-like” repair of AAA in case a horse-shoe kidney is present.

3. DISCUSSION

AAAs and urological neoplasms

In the literature it is estimated that approximately 75% of all cancer cases are diagnosed in patients more than 60 years old (4) which results in 14% of co-existence of AAA and any neoplasm (5). The detection of the aforementioned co-existence has been supported and amplified nowadays from the widespread use of several imaging techniques, such as ultrasound (US), computed tomography (CT) or magnetic resonance imaging (MRI) for the diagnosis and monitoring of AAAs, that led to the serendipitous detection of occult intraabdominal lesions, renal masses or neoplasms of the urinary bladder (6) as far as the urinary tract is concerned. Especially small solid renal masses are characteristic examples of incidentally discovered neoplasms by routine imaging use.

Since there are not randomized controlled studies yet in order to standardize optimal approach, the challenge for surgeons is still to establish the ideal treatment regarding optimal time of each surgical procedure and initial treatment priority or if they can be performed simultaneously, whereas optimal surgical strategy in case simultaneous treatment is chosen. There are small retrospective case series and case reports in the literature as an attempt to answer which is the ideal management, some of them with conflicting results (6-18). In most of the cases the final decision regarding staged or simultaneous as well as open or minimally invasive approach is based mainly on the clinical presentation of the diseases, with the most life-threatening lesion being the initially treated. What should be underlined in oncologic patients with AAAs, is the chemotherapy issue as sole or adjuvant treatment. There have been reports in the literature, although underpowered, suggesting that chemotherapy may favor the aneurysm evo-lution increasing the aneurysm diameter (18, 19), prioritizing the AAA repair over chemo-therapy administration. Along with that, there have been reports of increased risk of AAA rupture after open surgical procedures for tumor resection, in cases with aneurysm diameter more than 5 cm (20, 21) in the early postoperative period due to surgical

trauma and consequent inflammation. Aforementioned processes cause increase of aneurysm diameter, mediated by collagenases and metalloproteinases (18).

AAAs and urological benign lesions

Although there are several benign urological entities that might co-exist with an AAA, the most challenging - in terms of surgical management - urological manifestation in that field is the horseshoe kidney (HSK), which represents the commonest anatomic anomaly of the kidney and suggests a fusion of the lower poles of the kidneys in most of the cases either fibrotic or consisting of functional renal parenchyma (22). The incidence of a HSK is between 1:600 and 1:800 and it is twice as common in men than in women (23). Since men have a higher incidence of AAA (1) the combination of a HSK and an AAA is more frequent in men, rising 0.12% of patients (24).

The surgical challenge is the optimal repair of AAA with maximal preservation of renal function or minimal destruction of renal parenchyma. The later is the difficult, given that HSKs are characterized by great variation in origin, number and size of renal vasculature, with approximately only a third of HSKs supplied by a single renal artery in each side (22, 23). In the recent literature, there have been several reports with surgical techniques of simultaneous management with preservation of the isthmus, either open - transperitoneal (25) or retroperitoneal (26) - or endovascular (27-29). Although the later method seems the best approach to avoid all technical difficulties in cases of AAA and HSK, it is obvious that is accompanied with significant disadvantages if most or large arteries arise from the aneurysm, since aberrant arteries cannot be preserved or anastomosed with the endovascular procedure.

Even more rare but at least equally significant and surgically challenging are the cases where an AAA co-exists with a transplant kidney. In both allograft and autograft cases, there is a single renal artery and no collateral vasculature. Apart from the AAA repair, the goal is to avoid irreversible ischemic renal injuries due to warm ischemia, but there is not a widely accepted surgical protocol in AAA repair, yet (30).

4. CONCLUSION

AAA and simultaneous urological disorders, although rare, are challenging surgical cases in terms of successful aneurysmal repair along with minimally or null urological complications. Precise imaging preoperatively and meticulous surgical technique intraoperatively are of utmost importance and suggest our vast allies in successful out-comes.

- **Conflict of interest:** none declared.
- **Declaration of patient consent:** Authors certify that they have obtained patient consent form.

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