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Reconstruction of the renal artery during a living donor kidney transplant due to saccular aneurysm of the renal artery of the kidney graft: A case report and review of the literature

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Introduction

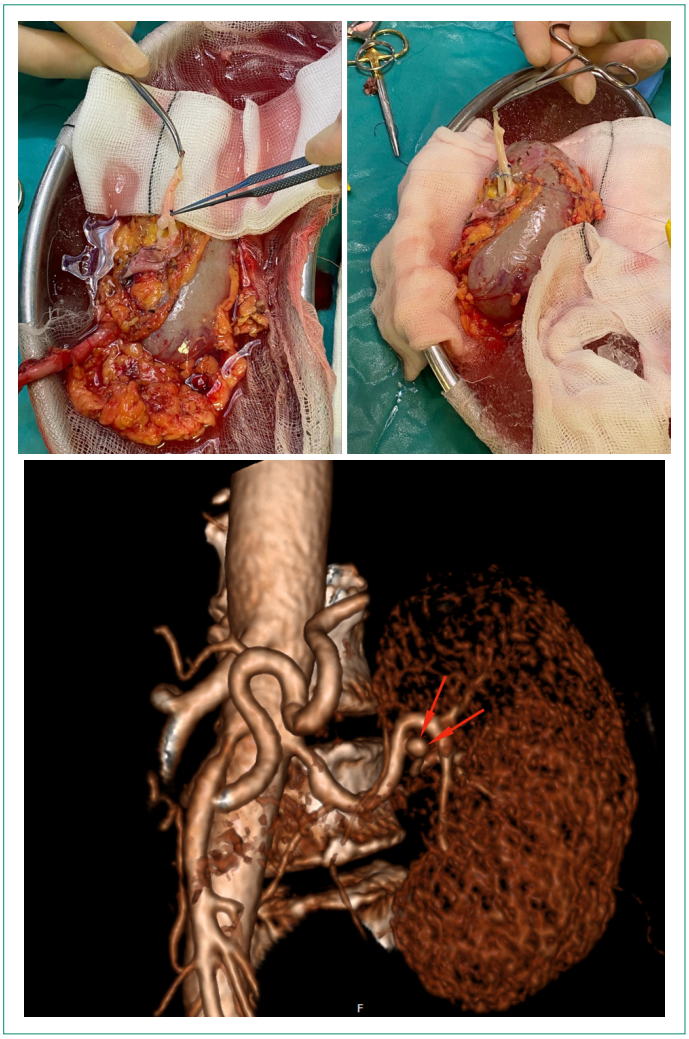
Renal Artery Aneurysms (RAAs) constitute a very rare entity, with an incidence rate of solely 0,1%, the majority of which are saccular in nature [1,2]. Mostly, they represent incidental findings either on scans performed for diagnostic reasons or during operation. In spite of the development of different endovascular therapeutic techniques, in terms of living donor kidney transplantation, RAAs are deemed to be a challenge. In the literature, successful cases of autotransplantation of kidneys with renal artery aneurysms, followed nephrectomy and renovascular reconstruction, have been described [3-6]. Therefore, the presence of RAAs, though controversial, should not be an inhibitory factor preventing a living donor kidney transplant, as studies have shown that kidney graft from living donors with the presence of RAA can be used after proper reconstruction [7,8], especially in an era dominated by the scarcity of kidney donors and grafts. We present a case of a 65-year-old female kidney transplant recipient from a related living donor with a saccular RAA followed by an ex vivo renovascular reconstruction.

Case presentation

A 65-year-old female patient was listed for a kidney transplant due to Alport syndrome, who had been on peritoneal dialysis for almost a year prior to her kidney transplant. Albeit she had been enrolled to the deceased donor list, she eventually received her kidney graft from a friend of hers (non-related), a 71-year-old female who underwent a hand-assisted Laparoscopic donor nephrectomy (LHALDN).

During the LHALDN, at the bifurcation of the main renal artery close to the hilum an aneurysm was observed, measured to be 5mm (not reported on the pre-operative CT scan of the donor). A 3D reconstruction of the CT scan was ordered periopertatively, revealing the saccular aneurysm right after the bifurcation of

the main renal artery (Figure). After a consensus involving the transplant surgical team along and the radiology team, it was decided to proceed with the operation. During the benching of the kidney graft followed its excision, aneurysm excision and renovascular reconstruction with interrupted sutures was performed, as shown in below figure. The following transplant procedure (in the right iliac fossa) was uncomplicated and the convalescence of the patient was uneventful. The recipient demonstrated primary graft function and was discharged on the 7th postoperative day.



Discussion

Renal Artery Aneurysms (RAAs) comprise a rather uncommon clinical entity, constituting usually an incidental finding during a Computer Tomography (CT) scan or Ultrasonography Scan (USS), given that the majority of them remain asymptomatic [1]. The symptoms, when present, are not specific, including hypertension or haematuria [1,2,10], whereas the most adverse and fatal complication is that of the rupture. Most RAAs are saccular in nature and are sited at the bifurcation of the main renal artery (approximately 60%), though they can occur at any renal arterial branch [9].

In terms of the patients with End Stage Renal Disease (ESRD), kidney transplant is deemed to be the ultimate options, offering the best outcome. However, the scarcity of kidney grafts and the disparity, in terms of number, between the offered kidneys and the patients needing a transplant constitutes a major conundrum in the field of transplantation. According to the latest National Data base annual report (NHSBT), by the end of March 2023, 5655 patients with ESRD registered on the kidney transplant waiting list, a constant increasing number, given the fact that the number of patients being reactivated on the list increases as well. On the other side, the number of deceased donors kidney transplant performed reached the number of 3272 over the same period (2349 involved deceased donor kidney transplant and 923 involved living donor kidney transplant) [15]. Despite the minor increase over the last year (1% and 4 respectively)

The implementation of extended criteria donor grafts as well as renal grafts demanding ex vivo reconstruction, due to anatomic aberrations or abnormalities, has demonstrated a constant increase over the last years [11,12].

Renovascular reconstruction can be very demanding and challenging, when required, in a kidney transplantation from living donors with vascular disease. Kawase et al. [13] have described three techniques of ex vivo renovascular reconstruction: i) Common channel, in which multiple arteries are reconstructed into a common channel, ii) Interposition of hypogastric artery, in which multiple renal arteries are reconstructed by interposition of excised hypogastric artery and iii) Resection of the aneurysm. Especially, in case of saccular RAA, after its excision, the reconstruction can be performed by interposition method or end-to-end anastomosis.

In the case of Muñoz-Vigna et al. ex vivo repair using the recipient epigastric vessels and saphenous veins was performed. In our case, the initial plan was to excises the impaired by the aneurysm part of the artery and perform an end-to-end anastomosis.

However, after a thorough discussion, we ended performing a complete excision of the renal aneurysm and end-to-end anastomosis of the remain renal artery.

Conclusion

To summarise, RAAs constitute a very rare entity which in the transplantation can pose a difficult surgical conundrum. However, based on our recent experience and the cases described in the literature, we believe that RAA would not prevent a kidney transplant to happen, since the is excision and renovascular reconstruction is feasible, in experienced transplant centres.

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