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Splenic artery aneurysm in kidney transplant recipient

Böbrek nakli alıcısında splenik arter anevrizması

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Abstract
In this article, we present the first case of SAA (Splenic Artery Aneurysm) in a kidney transplantation recipient, which was incidentally detected during the preparation of the transplantation and successfully treated. A 25-mm SAA was detected at kidney transplant recipient during the preparation examination by abdominal ultrasonography. Splenic artery ligation and aneurysmectomy was performed before the transplantation. Intraoperative Doppler ultrasonography revealed that there were no abnormalities of the spleen blood supply. During the first month of follow-up, the patient remained asymptomatic and laboratory investigations revealed no abnormalities. Selective ligation and resection of SAAs combined with spleen preservation is a safe treatment modality for selected cases with favorable short and long-term results, allowing the permanent treatment of the SAA, while preserving the splenic function.

Key words: Splenic artery aneurysm, kidney transplantation, aneurysmectomy.

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Öz
Bu yazıda, böbrek nakli alıcısında, nakil hazırlığı sırasında tesadüfen tespit edilen ve başarıyla tedavi edilen ilk SAA (Splenik Arter Anevrizması) vakasını sunuyoruz. Karın ultrasonografi ile yapılan hazırlık incelemesinde böbrek nakli alıcılarında 25 mm SAA saptandı. Nakil öncesi splenik arter ligasyonu ve anevrizmektomi yapıldı. İntraoperatif Doppler ultrasonografi ile dalak kan akışında herhangi bir anormallik olmadığı gösterildi. Takibin ilk ayında hasta asemptomatik kaldı ve laboratuvar incelemelerinde herhangi bir anormallik görülmedi. Dalak korunarak SAA'ların seçici ligasyonu ve rezeksiyonu, splenik fonksiyonu korurken SAA'nın kalıcı tedavisine izin veren, olumlu kısa ve uzun vadeli sonuçları olan seçilmiş vakalar için güvenli bir tedavi yöntemidir.

Anahtar kelimeler: Splenik arter anevrizması, böbrek nakli, anevrizmektomi.

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Introduction

The splenic artery is the most commonly affected visceral artery by aneurysms and pseudoaneurysms, although less often than only the aorta and iliac arteries. The incidence of splenic artery aneurysms (SAAs) ranges between 0.02% and 10.4% and are usually diagnosed incidentally during imaging investigations [1]. An SAA is typically saccular and often localized in the one-third distal of the artery, followed by the medial section and, rarely, in the proximal or intrasplenic area [2]. Computed tomography (CT) angiography is very sensitive for the diagnosis and characterization of SAAs, and three-dimensional reconstructions

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are usually required to eliminate false positivity of normal vascular folds and atherosclerotic changes.

The indications for SAA treatment are still controversial. Symptomatic SAAs diagnosed during pregnancy with an increased risk of rupture, or SAAs in women of reproductive age, and liver transplant recipients are the indications for treatment, regardless of the size of the aneurysm. Endovascular treatment is currently the preferred approach with the appropriate anatomical presence for SAAs [3]. Open surgical procedures include ligation, resection, and splenectomy. Various laparoscopic techniques have been described and provide a convenient and effective alternative to the traditional open surgical approach.

In this article, we present the first case of SAA in a kidney transplantation recipient, which was incidentally detected during the preparation of the transplantation and successfully treated.

Case report

A 38-year-old female patient was referred to our clinic as a kidney transplant recipient candidate. A 25-mm SAA was detected during the preparation examination by abdominal ultrasonography. The patient was thought to be asymptomatic. A detailed medical history revealed that she experienced intermittent epigastric pain. She was under follow-up due to chronic renal failure and was on an antihypertensive regimen. Abdominal magnetic resonance imaging (MRI) revealed a wide-neck saccular SAA with a diameter of 24×20×19 mm (Figure 1A, 1B). Based on the joint decision of the Transplantation Council and Interventional Radiology Department, splenic artery ligation and aneurysmectomy were decided for an endovascular approach due to the unfavorable anatomy of the SAA. A written, informed consent was obtained from the patient.

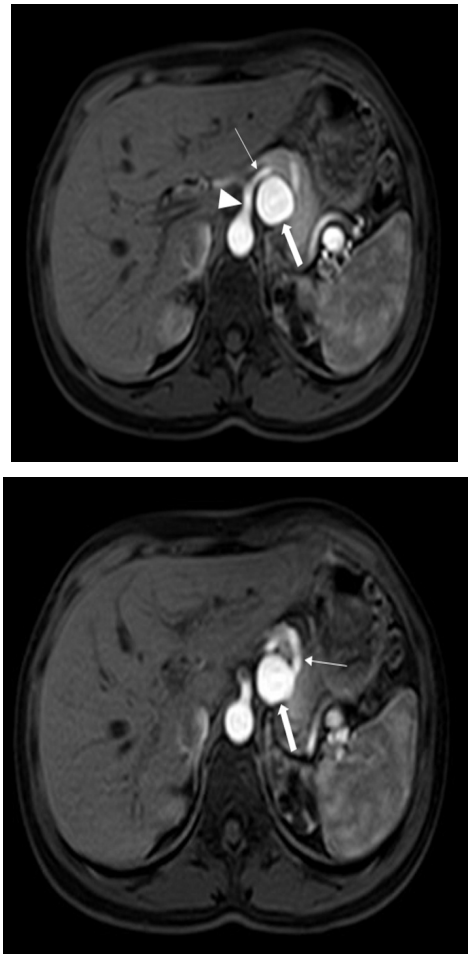

Figure 1A, 1B. Contrast-enhanced, axial, T1 weighted magnetic resonance images demonstrate a saccular aneurysm (large arrow) from the splenic artery (thin arrow) and celiac artery

Special care was exercised, particularly for the preservation of the spleen due to post-transplantation immunosuppressive therapy. At this stage, the most challenging issue for the decision-making mechanism was the timing of the living-donor kidney transplant. The review of the literature revealed no data regarding these two surgical procedures simultaneously. It was decided for the transplantation to be performed in a second session, as the aneurysm surgery could lead to splenic necrosis and require splenectomy. Epigastric mini-laparotomy combined with splenic artery ligation and aneurysmectomy was performed. After an epigastric mini-laparotomy gastrocolic ligament was opened and SAA was revealed. The aneurysm sac was meticulously dissected and aneurysmectomy performed by ligation of the splenic artery at the proximal and distal of the aneurysm sac. We also took care to protect the

short gastric arteries through the gastroepiploic arch in order to preserve splenic vascularization. Intraoperative Doppler ultrasonography revealed that there were no abnormalities of the spleen blood supply. The postoperative course was uneventful, and the drain was removed on the second postoperative day. On Day 2, Doppler ultrasonography revealed that the blood supply of the spleen was normal. A living-donor kidney transplant was successfully performed one week after the operation. There weren't any complications that developed after the transplantation. The patient was discharged on postoperative day 10 with complete recovery. The pathological examination of the resected aneurysm material confirmed the diagnosis and revealed a 25×22×19 mm saccular aneurysm with a mural thrombus.

During the first month of follow-up, the patient remained asymptomatic and laboratory investigations revealed no abnormalities. Therefore, no further interventions or follow-ups were scheduled. The patient is still under follow-up in the organ transplantation clinic.

Discussion

Although there are several surgical approaches described for SAA, there are very few published cases of SAA ligation and spleen preservation in the literature. In recent years, the incidence of SAA has been increasing due to the introduction of diagnostic tools for earlier detection and the frequent use of cross-sectional imaging modalities [4]. Despite the low incidence and often asymptomatic course, SAA rupture can be fatal [4]. Although it is usually defined as 2 cm [5], there is no consensus on the limits of the size of SAAs for the treatment. However, surgery is indicated in SAAs and symptomatic SAAs that are detected during pregnancy, in women of reproductive age, and in liver transplant recipients [6].

To the best of our knowledge, there are no guidelines or consensus for the treatment of SAAs. Endovascular approaches with transcatheter embolization are usually used due to their low morbidity and mortality rates. However, not all aneurysms are appropriate for this technique. The ideal form of treatment is to maintain flow in the splenic artery and to exclude the aneurysm from circulation [7]. Based on the joint decision of the Council, the open surgical approach was decided, as the artery folds and distal localization of the aneurysm made the endovascular approach less feasible. Several laparoscopic approaches have been described [8]. Initially, tangential stapler resection of saccular aneurysms was described to preserve the splenic flow; however, the chance of recurrence exists [9]. Proximal and distal ligations are safer approaches for SAAs, with or without resection and splenectomy [10]. Reconstruction of the vascular continuity of the splenic artery is not usually required due to the collateral circulation provided by the mini-gastric vessels. Nevertheless, an end-to-end anastomosis was used in the literature, particularly in young patients for whom spleen preservation was recommended [6]. Based on our experience, in this case, we recommend ligation and resection with spleen preservation in the surgical treatment of SAAs. To the best of our knowledge, there is only a limited number of case reports regarding aneurysmectomy with spleen preservation [11]. Dissection of distally located aneurysms is more challenging and, at this location, the splenic vein can be damaged, as the small branches may be in communication with the arterial branches. However, most of the SAAs are distal and less convenient to endovascular therapy [12]. Doppler ultrasonography is not essential; however, it may be helpful for the evaluation of the splenic arterial flow indications before and after the SAA ligation and resection [6]. Condensation of the splenic surface does not infer to the possibility of a future splenic infarction, and there is evidence which shows that improved splenic perfusion and collateral circulation can restore the flow to the spleen after the operation. Indeed, of these patients, 22% had zones of splenic infarction, although only 2% required surgery [13]. In our case, there was no evidence of an infarction zone, confirmed visibly or by ultrasonography.

In conclusion, SAAs have been increasingly detected thanks to the recent advancements in the field of imaging studies. Currently, there are no guidelines or consensus for the treatment of SAAs. A multidisciplinary approach is of utmost importance in the management of all visceral aneurysms. Predominantly distal location and the tortuous course of the splenic artery do not always indicate endovascular treatment of SAAs. Surgery is an important treatment method and several laparoscopic approaches

have been described in the literature. Selective ligation and resection of SAAs combined with spleen preservation is a safe treatment modality for selected cases with favorable short and long-term results, allowing the permanent treatment of the SAAs, while preserving the splenic function.

Conflict of interest: No conflict of interest was declared by the authors.

References

1. Jiang J, Ding X, Su Q, et al. Therapeutic management of superior mesenteric artery aneurysms. J VascSurg 2011;53:1619-1624. https://doi.org/10.1016/j.jvs.2011.02.004
2. Spanos CP, Ktenidis K, Saratzis N, Lazaridis I, Kiskinis D. Laparoscopic ligation of splenic artery aneurysms: report of two cases and literature overview. Updates Surg 2014;66:73-76. https://doi.org/10.1007/s13304-012-0180-1
3. Erben Y, Brownstein AJ, Rajaee S, et al. Natural history and management of splanchnic artery aneurysms in a single tertiary referral center. J Vasc Surg 2018;68:1079-1087. https://doi.org/10.1016/j.jvs.2017.12.057
4. Iida A, Katayama K, Yamaguchi A. Laparoscopic resection for splenic artery aneurysm using the lateral approach: report of two cases. Asian J Endosc Surg 2013;6:147-150. https://doi.org/10.1111/ases.12000
5. He MX, Zheng JM, Zhang SH, Wang JJ, Liu WQ, Zhu MH. Rupture of splenic artery aneurysm in pregnancy: a review of the literature and report of two cases. Am J Forensic Med Pathol 2010;31:92-94. https://doi.org/10.1097/PAF.0b013e3181c65da2
6. Xu WL, Li SL, Wang Y, et al. Laparoscopic splenectomy: color Doppler flow imaging for preoperative evaluation. Chin Med J (Engl) 2009;122:1203-1208.
7. İnan B, Teker ME, Ay Y, Aydın C, Zeybek R. Our experience on splenic artery aneurysms. Vasc Sur J 2013;22:257-262. https://doi.org/10.9739/uvcd.2013-37769
8. Małczak P, Wysocki M, Major P, et al. Laparoscopic approach to splenic aneurysms. Vascular 2017;25:346-350. https://doi.org/10.1177/1708538116682164
9. Müller Eschner M, Kortes N, Rehnitz C, et al. Endovascular repair of a complex splenic artery aneurysm using a multilayer stent. Cardiovasc Intervent Radiol 2015;38:494-497.
10. Lee SY, Florica O. Laparoscopic resection of splenic artery aneurysm with preservation of splenic function. Singapore Med J 2008;49:303-304.
11. LaBella GD, Muck P, Kasper G, Welling R, Schlueter F, Vaughan A. Operative management of an aberrant splenic artery aneurysm: utility of the medial visceral rotation approach: a case report and review of the literature. Vasc Endovascular Surg 2006;40:331-333. https://doi.org/10.1177/1538574406292005
12. Moriyama H, Ishikawa N, Kawaguchi M, Inaki N, Watanabe G. Laparoscopic approaches for splenic artery aneurysms. Minim Invasive Ther Allied Technol 2012;21:362-365. https://doi.org/10.3109/13645706.2011.636051
13. Toyoda Y, Igami T, Ochiai Y, et al. Single-Incision laparoscopic splenectomy for an unruptured aneurysm of the splenic artery. Med Princ Pract 2018;27:95-98. https://doi.org/10.1159/000485836

Informed consent: A written, informed consent was obtained from the patient.

Authors' contributions to the article

U.O., M.O., M.A. and M.C. have constructed the main idea and hypothesis of the study. O.B., S.Y., and E.D.Y. developed the theory and organized the material method section. The evaluation of the data in the results section was made by M.C. and M.O. The discussion part of the article was written by U.O., M.O., and H.C.A. reviewed, made the necessary corrections and approved. In addition, all authors discussed the entire study and approved its final version.