Resection of a Large Celiac Trunk Aneurysm Followed by Cadaveric Graft Reconstruction – A Case Report

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Abstract. Background/Aim: Celiac artery aneurysms represent rare eventualities which remain symptomatic for a long period of time; however, once diagnosed, it should be carefully monitored due to the high risk of developing life-threatening complications. When it comes to the types of therapeutic strategies, both endovascular and surgical therapies can be taken in consideration. Case Report: Depending on the patency of the collateral network, simple ligation or graft placement should be performed. The aim of the current paper is to report the case of a patient diagnosed with a celiac trunk aneurysm who was successfully submitted to resection in association with iliac graft placement between the abdominal aorta and the common hepatic artery. Conclusion: Whenever celiac artery aneurysm is diagnosed, it should be closely monitored and treated, resection and reconstruction being a feasible method in order to avoid the development of a life-threatening complication.

Celiac artery accounts for up to 30% of all visceral artery aneurysms, the most commonly encountered causes being represented by atherosclerosis or congenital defects, although initially the most frequently encountered causes were represented by Salmonella and Streptococcus infections (1, 2). Among visceral aneurysms they are situated in the fourth position, after splenic artery, hepatic artery and superior mesenteric artery (1). Most often they remain asymptomatic for a long period of time, and they are discovered when performing abdominal imagistic studies for other symptoms (3). Although they are asymptomatic, surgery should be taken in consideration when their dimension surpasses 2 cm in diameter due to the higher risk of rupture, which represents a highly mortal complication (4); therefore, once this lesion is ruptured, the mortality rate is of up to 40% even if surgery is tempted (5). Most often celiac artery aneurysm occurs in association with other visceral aneurysms while their treatment is dictated by the presence of a collateral system. In cases in which a functional collateral system is present, a simple ligation of the aneurysm is sufficient, the vascularization of the surrounding viscera being provided through this network. Meanwhile, cases presenting a poor collateral network, reimplantation of the celiac stump or of its branches is needed (6).

Case Report

In the current paper, we present the case of a 52-year-old patient with no significant medical history who was investigated for diffuse abdominal pain and was diagnosed with a celiac trunk aneurysm. After receiving the approval of the Ethical Committee of Fundeni Clinical Institute number 121/2021 data of the patient were reviewed and published in the current paper. The study was conducted according to the guidelines of the Declaration of Helsinki. Informed consent was obtained from the subject involved in
the study. Written informed consent has been obtained from the patient to publish this paper.

The patient was submitted to an abdominal computed tomography (CT) which demonstrated the presence of a celiac trunk aneurysm measuring 2 cm in diameter (Figure 1). The initial decision was to submit the patient to an active follow-up process; however, one month later the patient presented accentuation of the abdominal pain and therefore was further submitted to another CT which demonstrated the progression of the celiac artery aneurysm in association with a reduced arterial flow at the level of the common hepatic artery and complete thrombosis of the splenic artery (Figure 2). The decision of performing a surgical procedure was taken, so the celiac trunk aneurysm was resected; the intraoperative findings revealed a poor collateral network and therefore the decision of placing an arterial graft was taken; a cadaveric iliac artery was used and anastomosed between the abdominal aorta and the common hepatic artery; common hepatic artery thromboendarterectomy was also associated; meanwhile the left gastric artery and the splenic artery were ligated (Figure 3 and Figure 4). However, no ischemic complication occurred at the level of the surrounding viscera. The postoperative course was initially uneventful; however, in the 12th postoperative day the patient presented right upper abdominal pain in association with inflammatory system and increased levels of serum transaminases (ALT=540 u/l, AST=600u/l, GGT=780 u/l); the patient was submitted to an emergency CT which demonstrated the presence of an adequate arterial flow at the level of the arterial graft, no local thrombosis being related and raised the suspicion of an acute cholecystitis. The patient was resubmitted to surgery, a gangrenous acute alithiasic cholecystitis was found; therefore, a laparoscopic cholecystectomy was performed. The patient was discharged in the 23rd postoperative day with a good biological and clinical condition. Histopathological studies demonstrated the presence of a true arterial aneurysm with associated intraaneurysmal thrombosis (Figure 5). The CT scan performed at one month after discharge revealed a patent vascular anastomosis with an adequate flow at the level of the hepatic artery (Figure 6).

Discussion

The first celiac trunk aneurysm was described in 1745 during a necropsy (1). The first resection of a celiac trunk aneurysm was reported by Cooley and DeBakey in 1953 while the first resection followed by revascularization was described in 1958 by Shumacker (7, 8). In up to 20% of cases diagnosed with celiac trunk aneurysms, abdominal aorta aneurysm is associated (9). Although initially most celiac aneurysms were taught to have an infectious origin, in time increasing number of cases were associated with atherosclerosis although the age at the time of diagnostic was significantly lower when compared to the typical atherosclerotic patients age of diagnostic (3, 4).
Although most cases are asymptomatic, a limited number of patients will present diffuse abdominal pain or jaundice due to consequent compression of the common bile duct; in dramatic cases the signs and symptoms consist of hemorrhagic shock. Less frequently, a two-step hemorrhagic complication can occur; during the first step the aneurysm will exhibit a rupture at the level of the lesser sac while during the second step a free rupture into the peritoneal cavity will occur generating a severe hemorrhagic shock (6, 9).

The most widely recognized indications for surgical resection are represented by the presence of symptomatic aneurysms, of rapidly growing aneurysms or of calcified, larger than 3 cm aneurysms (4, 5, 10, 11).

Depending to the anatomical conditions, different types of surgical procedures have been proposed: aneurysmal suturing, aneurysmal ligation, or resection as stand-alone procedure if patent collateral circulation is present, and resection followed by arterial reconstruction using a synthetic or a biological graft.
if no adequate collateral circulation could be demonstrated. As expected, cases in which synthetic grafts are used are associated more frequently with graft-related complications such as infection or thrombosis; when it comes to the use of biological grafts, they can originate from cadavers or from live donors and can have an arterial or a venous origin. In cases submitted to arterial reconstruction, arterial grafts are preferred due to the lower risk of local thrombosis when compared to the venous grafts (10-15).

In the current case the decision of resection was given by the rapid enlargement of the celiac trunk aneurysm and by the association of common hepatic artery thrombosis (which explained why at the preoperative CT a poor blood flow at this level was found). Therefore, intraoperatively, before creating the anastomosis between the remnant common hepatic artery and the iliac graft revascularization of the common hepatic artery by thrombus removal was performed; meanwhile, the presence of a complete splenic artery thrombosis and the presence of an adequate collateral network at this level offered the chance of preserving the spleen; similarly, the presence of an adequate collateral flux through the greater curvature offered the opportunity of preserving in good conditions the entire stomach.

In certain cases, different techniques of endovascular surgery have been proposed as an alternative solution of standard surgery; in cases presenting local risk of rupture the aneurysm might be submitted to percutaneous embolization while cases presenting local thrombosis in association with signs of liver ischemia might be submitted to percutaneous stenting (15, 16).

Conclusion

Although it is an extremely rare finding which usually remains asymptomatic for a long period of time, when detected celiac trunk aneurysm should be closely monitored due to the possibility of evolving to serious and even fatal complications such as arterial aneurysm rupture. Whenever the signs of local evolution or local complications are suspected surgery should be taken in consideration. The type of the performed procedure ranges from simple ligation in cases in which an adequate collateral network is present to arterial reconstruction using different types of grafts; as expected the best results are obtained when arterial grafts are used, the interposition of venous grafts being more frequently associated with graft thrombosis.

Conflicts of Interest

The Authors declare no conflicts of interest.

Authors’ Contributions

Conceptualization, R.Z. and N.B.; methodology, A.P.; validation, R.Z. and T.S.; investigation, M.E.S. and C.S.; resources, A.N.; data curation, A.N.; M.E.S and T.S.; writing – original draft preparation, I.B. and N.B.; writing – review and editing, R.Z.; visualization, A.P.; supervision, A.P. All Authors have read and agreed to the published version of the manuscript.

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