SHORT REPORT

Traumatic Renal Artery Thrombosis Treated by Splenorenal Bypass—A Case Report and a Review of the Literature

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Key Words: Trauma; Renal vessels injury; Renal artery thrombosis; Splenorenal bypass.

Introduction

The vast majority of patients sustaining traumatic renal artery thrombosis are under 30 years of age, mostly children and adolescents.1 Computerized tomographic scan (CTS) has become the procedure of choice for the diagnosis of renal trauma, replacing intravenous pyelography and arteriography.2,3 Once the decision to operate the wounded patient has been reached, several surgical options are then available. One of these, which should be considered for restoring renal blood flow in left sided injuries, is to perform a splenorenal bypass with or without splenectomy.

Case Report

A 9-year-old boy was admitted to the emergency room following a head-on motor vehicle accident in which he was a restrained passenger. On arrival, the primary assessment of the patient was normal. The patient complained of severe abdominal and left chest pain. His physical examination findings were a seat belt sign across his abdomen, moderate abdominal distension with diffuse tenderness on palpation. The patient had microscopic haematuria and the serum creatinine was 0.7 mg/dl. Chest radiograph was normal. An ultrasound examination performed in the shock room revealed intra-abdominal fluid. Following these findings, and since the patient was haemodynamically stable, we elected to further evaluate his injuries by an abdominal contrast enhanced CTS. The CTS demonstrated a grade IV splenic laceration, and the left kidney showed no nephrographic effect. During the CTS, the patient became haemodynamically unstable with systolic blood pressure dropping to below 60 mmHg. Therefore, the patient was taken promptly into surgery. After evacuation of blood from the abdominal cavity, a severely injured spleen was noted and removed. Following colonic mobilization and upon achieving renal vascular control the left kidney was exposed, and was found to be ischemic with renal artery thrombosis. At this point, the patient maintained vital signs within the normal range, and it was decided to revascularize the kidney. The splenic artery was dissected free along its course. Fogarty thrombectomy of the distal renal artery was carried out and an end-to-end anastomosis between the splenic artery and the distal renal artery was performed. Upon completion of the procedure the kidney regained a normal colour and there was a good quality Doppler signal at the renal hilum. One month after discharge a follow-up CTS was carried out. The left kidney was functioning but had a slightly delayed excretion. In the following year the patient became hypertensive. CTS demonstrated a shrunked, poorly functioning kidney. The patient maintains a normal

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blood pressure with medication. The option of nephrectomy has been rejected by his parents.

Discussion

The majority of renal pedicle injury is caused by blunt trauma. This rare injury has been reported in less than 5% of blunt abdominal trauma cases. Parenchymal injury is often absent in cases of pedicle trauma, but non-renal injuries frequently coexist. Approximately 20% of patients with renal artery injury secondary to blunt trauma also suffer from splenic injury. Lacerations and avulsion of the renal vessels usually require surgical exploration. The treatment of renal artery thrombosis remains controversial. Patients with abdominal trauma who are haemodynamically unstable should promptly be taken for surgical exploration. However, for haemodynamically stable patients an expectant policy is preferred by some authors. The presented patient had microscopic haematuria. The finding of haematuria is inconsistent in diagnosing renal artery injury. One literature review of renal artery trauma noted that only 30% of cases had gross haematuria. The spiral CTS is a non-invasive, accurate method which provides us with information regarding renal parenchymal injury and pedicle interruption, as well as other intra-abdominal injuries. Thus it seems to be the favoured diagnostic tool, replacing other modalities such as intravenous pyelography, isotopic flow renogram, and angiography. Furthermore, the abundant use of CTS may increase the frequency at which renal artery injuries are diagnosed. The delay in performing revascularization of the kidney should not extend beyond the time limits of warm ischemia. The exact limits of renal tolerance to ischemic insult are unknown. The interval between injury and restoration of blood flow should not exceed 4 h, and is influenced by several factors, among which are age, pre-existing vascular and nephron diseases, and the presence or absence of accessory renal arteries. There is a wide variety of techniques available for the repair of renal artery injury. Alternatives include primary repair of the injured artery, re-implantation of the native renal artery into the aorta or a bypass that may be either anatomic with autogenous or synthetic material, or extra anatomic such as a spleno- or hepatorenal bypass. The surgeon should choose the preferred method of repair according to the general condition of the patient, the type and location of the injury, and the presence of other injuries. The salvage of a kidney by creating a splenorenal bypass does not preclude preservation of the spleen. If the spleen is uninjured it may be left in place, while receiving its blood supply from the short gastric arteries. Splenorenal bypass for left renal artery injuries has several distinct advantages when compared to other techniques, especially in paediatric patients. The use of an autogenous graft is preferred in young patients due to its better patency and lower infection rates in the long term, and because it permits a proportional growth of the arteries. The use of an autogenous graft is preferred in contaminated conditions, which is the state in many abdominal trauma cases. An autogenous arterial–arterial vascular anastomosis is superior over a saphenous vein graft because, there is an excellent size match between the renal artery and the splenic artery. It substitutes the saphenous vein in situations when an autogenous graft is desired but harvesting the vein is impossible due to severe lower extremity trauma. The presented case adds to previous published data that despite technically successful renal revascularization the natural outcome of the traumatized kidneys is that of significantly impaired renal function, or even complete secondary non-function, hypertension, chronic pyelonephritis, and late nephrectomy. Clark et al. reviewed 228 patients who had unilateral injuries. Thirty-four of these patients were revascularized with a success rate of 23%. Eighteen percent of the revascularized patients developed renovascular hypertension. In conclusion, splenorenal bypass is a technically demanding procedure, not always resulting in a successful salvage of the kidney. Thus it should be considered as an option in the treatment of renal artery injuries in a selective group of patients in whom salvage of the kidney is of utmost importance (i.e. in the absence of a functioning kidney on the contralateral side). Endovascular stenting is a promising technique that may substitute in the future other surgical methods. There are few case reports in the literature of successful placement of endovascular stents for blunt renal artery injury.

References

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Accepted 1 December 2003