Spontaneous Isolated Dissecting Infra-renal Abdominal Aorta In A 33-years-old Man, Presenting As Left Loin To Left Iliac Fossa Pain And Acute Retention Of Urine: - A Case Report With A Review Of The Literature

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Abstract

Spontaneous Isolated Dissecting infra-renal abdominal aorta in a 33-years-old man, presenting as left loin to left iliac fossa pain and acute retention of urine: - A case report with a review of the literature.

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Abstract:

“Background”
Spontaneous isolated infra-renal abdominal aorta dissection is very rare. In view of the rarity of the condition most practitioners may not be familiar with the presentation and management of the condition. Practitioners need to be aware of the fact that patients with Infra-renal abdominal aorta dissection may be referred first to the urologist because of loin pain.

“Aims”
To report the presentation and investigation of a patient who was diagnosed to have infra-renal abdominal aortic dissection and to review the literature on infra-renal abdominal aorta dissection

“Case Report”
A 33-years-old man was admitted with a three days history of left loin pain. On the day of admission the patient’s pain had shifted from the left loin to involve the left iliac fossa at which time the loin pain had disappeared. He also had a desire to void but he could not pass any urine. He had 7 years prior to his admission been involved in a road traffic accident and has been left with weakness in his left upper limb pursuant to the development of brachial plexus injury. He was treated two years prior to his admission by means of extracorporeal shock wave lithotripsy for a right renal pelvis calculus with complete clearance of the calculus; he stated that his presenting symptoms were similar to his previous right renal colic pain. His general examination was unremarkable. He was tender in the left iliac fossa and was clinically found to have acute retention of urine. A provisional diagnosis of left sided renal/ureteric colic and retention of urine was made. He was catheterized and 500 mls of urine was drained. CT angiography done soon after admission confirmed an infra-renal abdominal aorta dissection involving both iliac arteries. CT scan of his thorax was normal

He was therefore quickly handed over to the vascular surgical team on call for further management. Literature review confirmed that less than 70 cases of isolated spontaneous infra-renal abdominal aorta dissection have so far been reported in the English literature; infra-renal dissection of abdominal aorta involving iliac and femoral arteries are associated with iliac fossa pain and or claudication.

“Conclusions”
CT scan should be the first radiological modality for the investigation of “ureteric /renal colic” because of its advantage in confirming the cause of the “renal colic type pain”; whether the cause of the symptom is of renal tract or extra renal tract origin.

Key Words: Infra-renal; abdominal aorta; dissection; iliac arteries; retention; CT scan; loin pain; iliac fossa.

Introduction
Spontaneous isolated infra-renal abdominal aorta dissection is extremely rare. In view of the rarity of the condition, an extensive review of the literature is required to enable practitioners understand its presenting features, investigation and management. This manuscript reports the presentation and investigation of a case of infra-renal abdominal aorta dissection which had extended to involve the iliac arteries with an extensive review of the literature.

Case Report

A 33-years-old man was referred to the surgical triage unit with a three days history of left loin pain, which had shifted to involve the left iliac fossa on the day of admission. He also stated that: he his urinary bladder had been full for a few hours but despite a few attempts to void he had been unsuccessful; the pain which was initially in his left loin had resolved and he was left with pain in the left iliac fossa and this new pain has been constant for a few hours.

Two years prior to his admission he was admitted because of a colicky right loin to groin pain and he was diagnosed as having renal colic which was confirmed by means of excretory urography which revealed a 1cm calculus in his right renal pelvis. The stone was treated by means of extra-corporeal- shock-wave lithotripsy with complete clearance of the stone from his right renal tract. There was no calculus anywhere else in his renal tract at that time. He felt that his recent symptoms were similar to the symptoms which he had at the time he was diagnosed two years earlier as having renal with exemption that he did not have any problems with voiding then. He had also never had a problem with voiding prior to the day of admission.

Seven years prior to his admission he was involved in a road traffic accident and was initially managed in an intensive care unit. He had left brachial plexus injury at that time but he recovered from that injury but was left with residual weakness of his left upper limb. He had not notice any blood in his urine prior to his admission or in association with his recent pain. His general examination was unremarkable. There was no evidence of pallor. His radial pulse rate was 70 per minute and his blood pressure was 130/70 mm of mercury. Urinalysis revealed + of blood and trace of protein only. His respiratory and cardiovascular systems were found on examination to be unremarkably normal. His abdominal examination revealed left iliac fossa tenderness as well as tenderness in the left loin. In addition there was evidence of supra-pubic dullness.

A provisional diagnosis of left sided renal colic and acute retention of urine was made. He was catheterised and 500 ml of clear urine drained; his catheter was therefore left connected to a urinary catheter bag for continuous urinary drainage and monitoring of his urine output. He was given Morphine 10 mg intramuscularly and his loin and left iliac fossa pain resolved. He also had intravenous infusion. He had other investigations with the corresponding results as follows:

- Urine examination by flow cytometry: white blood cells 17/u-L (normal range [0-40 u/L]); red blood cells 24 u/L (normal range [0-35 u/L]); epithelial cells normal.
- Urine culture - no growth.
- Full blood count: Haemoglobin 15.4 g/d-L (normal range [13-18 g/d-L]); white blood cell count 12.5 x 10^9/L (normal range [4.0-11.9 x10^9/L]); platelets 292 x 10^9/L (normal range [150-450 x10^9/L]).
- Serum urea and electrolytes: Sodium 132 m-mol /L (normal range [136-145/L]); Potassium 4.3 m-mol /L (normal range [3.5 -5.4 m-mol /L]; creatinine 74 m-mol/L (normal range [62 – 115 m-mol /L]); urea 8.4 m-mol/L (normal range [2.5-8.7 m-mol /L]); eGFR > 90 mls / minute.
- Serum Calcium - normal
- Liver function tests – normal
- Coagulation screen – normal.

He had CT-scan of abdomen (pre and post contrast) shortly after the initial investigations whilst in the surgical triage unit which revealed no abnormality in the renal tract but surprisingly the scan revealed a dissecting infra-renal abdominal aorta which extended to involve both iliac arteries. He remained in a stable condition and was immediately referred to the vascular surgical team on call who took over the patient’s management and he was transferred to the vascular surgical unit. In the Vascular surgical unit he had CT scan of the chest which was normal. The circulation to his lower limbs remained normal. He was managed conservatively and was discharged after his symptoms subsided.

Discussion

Aortic dissection emanates from entry of blood into the tunica media, where it separates the aortic wall into an inner layer which is comprised of the intima and part of the media and an outer layer, which is comprised of part of the media and the adventitia, resulting in a double lumen aorta (a true lumen and a false lumen). Systemic arterial hypertension has been identified as the single most consistent predisposing factor in aortic dissection. Other identified causes of aortic dissection
include:
- Marfan's syndrome;
- Ehlers Danlos' syndrome;
- Coarctation of aorta;
- Bicuspid aortic valve;
- Hypoplasia of aorta;
- Cystic medial necrosis;
- Trauma;
- Pregnancy;
- Iatrogenic causes.

Majority of dissections of the aorta originate in the intra thoracic aorta and primary dissection of the intra abdominal aorta is rare. In a review of 505 cases of dissecting aneurysms of the aorta, Hirst and associates [1] reported an incidence of 2.5% of abdominal aortic dissection. Crawford and Crawford found only one case of infra-renal aortic dissection out of 250 cases of thoraco-abdominal aortic dissections [2].

The abdominal aorta dissection can be divided into primary and secondary groups:

The primary (spontaneous) abdominal aortic dissections are associated with degenerative disease of aorta (atherosclerosis, cystic or myxoid degeneration of media);

Secondary abdominal aortic dissections are in most cases traumatic (accidental or iatrogenic) or rarely they are caused by Salmonella enteritidis infection. [3]

Spontaneous infra-renal abdominal aortic dissection is very rare and a review of the English literature revealed that up to 2002, there were 41 previously published cases. Gloviczki et al. reported the 42nd case of spontaneous isolated infra-renal abdominal aorta dissection. [4] Gloviczki and associates [4] in their review of infra-renal abdominal aortic dissections found that:

Out of the 42 reported cases up to 2002 that the mean age of patients with infra-renal abdominal aortic dissection was 58 years;

74% of the patients were male;

62% had hypertension;

None had Marfan or Ehlers-Danlos syndrome;

More than three fourths of the patients had symptoms;

6 patients (14%) presented with aortic rupture;

Dissection was limited to the infra-renal aorta in 50% and extended into the iliac or femoral arteries Three patients died before treatment;

No patient died after endovascular repair or after open aortic grafting;

Mortality following rupture was 67%;

Abdominal aortic dissection did not recur but 1 patient died at 14 months as a result of rupture of a thoracic aneurysm. Gloviczki and associates [4] concluded that:

Spontaneous infra-renal abdominal aortic dissections are rare; but usually symptomatic and 14% rupture; rupture carries high mortality; elective open repair is recommended; but endovascular repair is a new treatment option for suitable patients.

Since 2002, 25 of other cases of infra-renal abdominal aortic dissection have been reported in the English literature to our knowledge giving a total of 67 reported cases of isolated spontaneous infra-renal abdominal aortic aneurysm dissection prior to the publication of our case [5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24].] Our case is therefore to our knowledge the 68th reported cases of spontaneous isolated dissection of infra-renal abdominal aorta. Spontaneous non-traumatic rupture of a non-aneurysmatic infra-renal abdominal aorta is usually associated with some form of connective tissue or autoimmune disease, which causes weakness of the aortic tunica media. However, Pol et al, [5] reported a 10-year old girl who developed a non-traumatic rupture of a non-aneurysmatic abdominal aorta which was treated by using a 10 mm GORE-TEX graft; histological investigation of microscopic sections of the ruptured aorta, molecular biological, and DNA mutation analyses did not demonstrate any abnormalities.

Pei et al. [6] reported two cases of infra-renal abdominal aortic dissection (IAAD) that were treated by endovascular aortic repair (EVAR). The EVAR procedure was successful, even though one patient developed a proximal type 1 endoleak several months after the procedure; both patients remained symptom-free more than 24 months after surgery. They reported that literature review had revealed that EVAR had been performed in 14 cases of 1AAD. They concluded that: based upon these 14 cases they believed that EVAR is feasible and effective for the treatment IAAD; this treatment strategy represents a reasonable alternative to open surgery, especially in cases of complicated juxta-renal abdominal aortic dissection.

Iwasaki et al. [7] reported the case of a 62-years-old woman with spontaneous infrarenal abdominal aortic dissection, which developed into claudication and rest pain in the lower extremity. Multi-row detector computed tomography showed the entry site of the abdominal aortic dissection at the second lumbar artery, while the re-entry site was found infra-operatively at the median sacral artery, indicating that the false lumen had progressed and compressed the true lumen. Iwasaki et al. concluded that a direct approach involving grafting appears to be an effective procedure for resolving mesenteric and lower extremity hypo-perfusion due to aortic dissection with...
a dilated false channel, even during the acute period. Iper et al. [8] reported a case with spinal cord ischemia and consecutive paraplegia following spontaneous isolated abdominal aortic dissection (IAAD). A 63-years-old female was admitted to the surgical emergency room with severe lumbar back pain and accompanying paresthesia of both legs. Contrast enhanced computed tomography (CT) of the abdomen showed an infra-renal IAAD in a normal size aorta with patent lumbar arteries. It was assumed that a surgical or interventional approach would not be helpful to improve spinal cord perfusion. In view of this non operative therapy consisted of lowering blood pressure to prevent further dissection. The patient developed an anterior spinal artery syndrome with permanent paraplegia. Thus, blood pressure was raised for optimal spinal cord perfusion. In order to lower spinal pressure, cerebrospinal fluid drainage was attempted. A three month follow-up CT scan showed spontaneous remodelling of the aorta. The neurological deficit persisted. They concluded that: IAAD is a rare differential diagnosis of lumbar back pain and can be associated with paraplegia as the leading symptom; individualized treatment is indicated; surgical treatment options concerning paraplegia are limited.

Matsuno et al. [9] reported a case of localized dissecting aneurysm originating from the infra-renal abdominal aorta in a 62-years-old man. Open surgical repair was successfully performed without any complication.

Tolva et al. [10] reported a case of SIAAD occurring in the normal aorta of a patient who presented with severe lower back pain radiating to the abdomen, not responding to common pain-killers. A complete exclusion of the dissected aorta was accomplished with a bifurcated endovascular graft using a simple technique. They concluded that endovascular therapy is a safe option and can be considered the treatment of choice even for dissection extending into one or both iliac arteries.

Adam et al. [11] reported a 90-years-old who presented with lower extremity ischemia due to spontaneous dissection of a non-aneurysmal infra-renal abdominal aorta. The aneurysm was treated using an aorto-uni-iliac stent graft with contra-lateral common iliac artery occlusion and femoro-femoral cross-over by pass. The patient underwent digital amputation and debridement of the foot four weeks post operatively. At 12 months follow-up, he remained symptom-free with an excluded dissection, patent reconstruction and healed foot.

Wang et al. [12] reported the treatment of infra-renal abdominal aortic dissection concomitant with an aneurysm. Caronno et al. [13] reported three patients, two men and one woman, with a mean age at diagnosis of 69 years. In all three cases, chest CT scan did not reveal evidence of thoracic aortic dissection. The mean maximal aneurysm diameter was 6.7 +/- 1.5 cm (range 5.5 to 8 cm). All patients underwent stent-graft repair. Follow-up computed tomographic (CT)-angiography examinations were scheduled 1, 4, and 12 months after the procedure. They also reported that stent-graft deployment was successful in all three cases. Intra-operative mortality was not observed. All patients were adequately treated with a bifurcated device. Intensive care unit (ICU) was never required. Mean hospitalization was 4.6 days (range: 4 -6 days). The mean follow-up was 18 months. No stent-graft complication was observed. They concluded that endovascular repair for isolated infra-renal abdominal aortic dissecting aneurysms, is feasible and effective.

Mart et al. [14] reported the case of an 18-years-old man who had a fall with blunt abdominal trauma. The patient had hypovolemic shock and findings of acute abdomen. Initial computed tomography (CT) showed pulmonary contusion, pneumomediastinum, hemoperitoneum, hepatic contusion, right kidney laceration and vascular avulsion, rupture of the mesenteric vein, rupture of the right rectus muscle with bowel hernia, and infra-renal aortic dissection. There were no signs of limb or medullar ischemia. After haemodynamic stabilization and surgical repair of the associated lesions, the dissection was successfully treated with a self-expanding aortic Wallstent. Post-procedure CT scan showed a well positioned patent stent and the patient was discharged asymptomatic. They concluded that per-cutaneous endovascular stent implantation is minimally invasive and seems to be a safe treatment for traumatic dissection of the abdominal aorta.

Nakajima et al. [15] reported the case of a 53-years-old man with renal and bilateral limb ischemia due to Stanford B aortic dissection. The thrombosis of the false lumen had progressed and compressed the true lumen, developing renal and leg ischemia. Urgent graft replacement of the infra-renal abdominal aorta with proximal fenestration was successfully performed and the patient was discharged without complications. Ghekiere et al. [16] reported dissection of the infra-renal abdominal aorta emanating from blunt trauma.

Garrett and Wolf [17] reported the management of acute infra-renal aortic occlusion secondary to type “A” dissection. They described a technique of immediate reperfusion of the lower extremities through an axillo-bifemoral graft in 2 patients with good results.
Baumgartner et al. [18] reported a case of ruptured acute, infra-renal dissecting aortic aneurysm. Orihashi et al. [19] examined 11 consecutive patients with aortic dissection in whom the abdominal aorta was intact, and surgeries were performed with femoral perfusion. The abdominal aorta and visceral branches were examined for new development of dissection or mal-perfusion by means of trans-oesophageal echocardiography before, during, and after cardiopulmonary by-pass. These echocardiographic findings were then related to the post operative assessment and mid-term results. Aortic dissection was found in 3 of 11 cases (27.2%). Unusual progression of metabolic acidosis (base excess < or = 10 mEq/L) occurred, possibly as a sequel of mal-perfusion of visceral arteries in 2 of 3 cases, whereas none of 8 cases presented with such findings.

The presence of dissection was later confirmed by post-operative computed tomography in all but 1 case. In the mid-term follow-up period, aneurysm formation was found in the infra-renal aorta and iliac arteries in 2 of the 3 cases with new aortic dissection but not in any of the remaining 8 cases. They concluded that: New development of aortic dissection after formation after femoral arterial perfusion was found in 27% of the cases in this series. Although these occurred without dramatic symptoms, this event may be related to unusual metabolic acidosis during cardiopulmonary bypass or to subsequent aneurismal formation of the infra-renal aorta or iliac arteries or both.

Porcelini et al. [20] in 2005 reported a case of endograft repair of infra-renal abdominal aortic dissection. Farber et al. [21] reported a case of a patient with spontaneous infra-renal abdominal aorta dissection (SIAAD) who presented with claudication. They reviewed the English literature on this disorder and specifically evaluated the differences between patients on the basis of their presenting symptoms. They found that: patients who had SIAAD and lower extremity ischemia were more likely to have the dissection process extend into the iliac or femoral artery and were less likely to have an associated abdominal aortic aneurysm; aortic rupture in the presence of SIAAD was associated with increased risk of death.

Guidice et al. [22] described how the combined use of duplex and intravascular ultrasound (IVUS) can assist in the evaluation and treatment of isolated abdominal aortic dissection without need for contrast angiography. They reported a 78-years-old man who presented with intermittent bilateral buttock and thigh claudication. Duplex ultrasound and contrast-enhanced computed tomography (CT) confirmed a chronic dissection along 3 to 4 cm of the infra-renal abdominal aorta. During Extra Large Pulmaz stent implantation, the procedure was based on IVUS images and fluoroscopy without angiography. Both duplex and IVUS images were critical in assessing the type and extent of the lesion to be treated in guiding the procedure, and in assessing its satisfactory outcome. They concluded that in selected cases, ultrasound-based imaging modalities can provide most of the information required to accomplish complex aortic procedures.

Frahm et al. [23] reported a case of aorto-iliac occlusion due to descending aortic dissection treated initially with femoro-femoral cross-over bypass and secondarily with unilateral aorto-iliac stenting because of progression of the dissection. A 75-years-old man presented with acute ischemia of the right leg. CT scan revealed occlusion of the right iliac artery due to descending aortic dissection with clotted false lumen. Three days after femoro-femoral cross-over bypass, ischemia of both legs developed and angiography revealed occlusion of the infra-renal aorta and the left common iliac artery. Two overlapping stents were deployed in these vessel segments. Completion angiography confirmed successful recanalization with adequate distal flow and good patency of the cross-over bypass. The patient’s peripheral pulses were restored and his symptoms were alleviated. They concluded that combined treatment with cross-over bypass and endovascular recanalization may be considered as a viable alternative to open aortic surgery in selected cases of complicated aorto-iliac dissection with bilateral leg ischemia.

Lotfi et al. [24] reported an acute spontaneous rupture of an aortic dissection originating in and limited to the infra-renal aorta associated with an infra-renal aortic aneurysm. The diagnosis was established by ultrasonography and computed tomography and was confirmed intra-operatively followed by a successful graft insertion. Flores et al. [25] in 2002 reported a case of aortic dissection with aneurysmal dilatation (dissecting aneurysm) of the infra-renal abdominal aorta in a 51-years-old female.

In addition to the aforementioned reports of infra-renal abdominal aortic dissections between 2002 and 2010 few other cases of infra-renal abdominal dissections / aneurysms have been reported contemporaneously with infra-thoracic aortic dissections and aneurysms in that period and these include the following: Zipfel et al. [26] reported the case of a 72-years-old man who presented with pericardial tamponade, which was treated with pericardial drainage. A small intramural hematoma of the ascending aorta was found originating from a proximal descending thoracic
anterior aortic dissection (TAA); he additionally had an infrarenal abdominal aortic aneurysm (AAA). Pursuant to stabilization of the hematoma 7 weeks later, the TAA was repaired with a Relay stent-graft. Type “A” dissection ensued after 3 days and acute rupture of the AAA 6 days later. Emergency surgical repair of both complications achieved successful outcome of an extended 3-stage procedure. They concluded that this case provides insight into the mechanisms that may contribute to stent-graft associated type A dissection. Probably the previous separation of the aortic wall layers by the intramural hematoma triggered the complication; although the aorta appeared to have stabilized.

Lather et al. [27] reported a 64-years-old woman with a history of hypertension dyslipidemia who presented with anemia, low back pain, and a recent 30-pound weight loss who was found to have inflammatory aneurysm of the thoraco-abdominal aorta with associated dissection.

Tomihara et al. [28] reported a 24-years-old pregnant woman with Marfan’s syndrome delivered by cesarean section during the 38th week of gestation. Even though aortic root dilatation did not increase during pregnancy, three months after delivery the patient noticed a pulsatile abdominal mass. Aortic aneurysm was diagnosed and surgical replacement of the infra-renal abdominal aorta to the common iliac arteries and reconstruction of the inferior mesenteric artery were performed. In addition, the patient developed a Stanford type B thoracic aortic dissection, even after more than four months of beta-blockade.

Li et al. [29] reported that a 65-years-old man developed acute DeBakey type IIIb aortic dissection and was treated medically. The affected aorta dilated progressively, reaching a maximal diameter of 7cm 2 years later. Computed tomography revealed a Crawford type II thoraco-abdominal aortic aneurysm and additional infra-renal abdominal aortic aneurysm below the dissection aorta. The descending thoracic aorta and the abdominal aorta were completely replaced with a Hemashield graft under deep hypothermic circulatory arrest. The postoperative course was complicated with transient left hemiparesis and upper gastrointestinal bleeding which were successfully treated by transarterial embolization. They concluded that the results of this case indicate that complete replacement of the descending thoracic and abdominal aorta can adequately and safely treat type III aortic dissection.

Haulon et al. [30] reported that approximately 6 months after the successful implantation of an abdominal aortic endovascular graft, a patient suffered an acute aortic dissection. The false lumen of the dissection terminated in the excluded aneurysm sac, resulting in a lack of outflow. Extreme true lumen compression eliminated blood flow within the distal aorta, resulting in the patient’s demise.

Tefera et al. [31] reported that a 73-years-old patient was admitted because of acute descending thoracic and abdominal aortic dissection. He was also found to have an 8-cm infra-renal abdominal aortic aneurysm (AAA). Pursuant to initial medical management of the acute aortic dissection, the patient underwent endoluminal abdominal AAA repair with an AneuRx stent-graft. The completion angiogram showed that the graft was deployed in the false lumen; this complication was treated with fenestration of the intimal flap, establishing flow through both lumens. The patient’s recovery was uneventful, and he was discharged on the fourth postoperative day. Follow-up at 1 year with computed tomographic angiography documented a stable descending thoracic aorta with a suggestion of a type II endoleak and no change in the aneurysm volume. They concluded that this case illustrates the feasibility of endograft repair of infra-renal AAA with a modular stent-graft in the presence of aortic dissection extending below the renal arteries.

Literature review has revealed that when a patient’s symptom is related to loin pain only then the dissection is almost invariably limited to the infra-renal aorta but in cases where the patients’ symptoms include groin pain, iliac fossa pain, or claudication then the iliac arteries / femoral arteries are also involved with the dissection.

Our patient had left loin pain for three days which would be indicative of infra-renal artery dissection but on the third day when his left loin pain shifted to involve his left groin/left iliac fossa would be suggestive of the fact that the dissection had extended to involve the left iliac artery at least. Acute retention of urine has not been reported in relation to infra-renal aortic dissection however, it would be said that acute retention of urine would be indicative of iliac artery involvement of the dissection.

The aetiology of the dissection in our patient cannot be explained. It was known that the patient had been involved in a road traffic accident many years prior to his presentation with the dissection; whether or not he developed a slight intimal damage to his infra-renal artery at the time of his accident cannot be said for certain. The patient had extra corporeal shock wave therapy for a 1-cm calculus in his left renal pelvis two years prior to the diagnosis of his infra-renal abdominal aortic dissection. To our knowledge there has not been any report of aortic dissection complicating extra corporeal shock wave lithotripsy. It
The abdominal aorta dissection can be divided into thoraco-abdominal aortic dissections \[2\], infra-renal aortic dissection out of 250 cases of Crawford and Crawford found only one case of abdominal aortic dissection. Hirst and associates \[1\] reported an incidence of 2.5% of dissecting aneurysms of the aorta, Iatrogenic causes. Pregnancy; Trauma; Cystic medial necrosis; Hypoplasia of aorta; Bicuspid aortic valve; Coarctation of aorta; Ehlers Danlos' syndrome; Marfan's syndrome; include: dissection. Other identified causes of aortic dissection include: Marfan's syndrome; Ehlers Danlos' syndrome; Coarctation of aorta; Bicuspid aortic valve; Hypoplasia of aorta; Cystic medial necrosis; Trauma; Pregnancy; Iatrogenic causes. Majority of dissections of the aorta originate in the intra thoracic aorta and primary dissection of the intra abdominal aorta is rare. In a review of 505 cases of dissecting aneurysms of the aorta, Hirst and associates \[1\] reported an incidence of 2.5% of abdominal aortic dissection. Crawford and Crawford found only one case of infra-renal aortic dissection out of 250 cases of thoraco-abdominal aortic dissections \[2\]. The abdominal aorta dissection can be divided into primary and secondary groups:

- The primary (spontaneous) abdominal aortic dissections are associated with degenerative disease of aorta (atherosclerosis, cystic or myxoid degeneration of media);
- Secondary abdominal aortic dissections are in most cases traumatic (accidental or iatrogenic) or rarely they are caused by Salmonella enteritidis infection. \[3\]
- Spontaneous infra-renal abdominal aortic dissection is very rare and a review of the English literature revealed that up to 2002, there were 41 previously published cases. Gloviczki et al. reported the 42nd case of spontaneous isolated infra-renal abdominal aorta dissection. \[4\] Gloviczki and associates \[4\] in their review of infra-renal abdominal aortic dissections found that:

Out of the 42 reported cases up to 2002 that the mean age of patients with infra-renal abdominal aortic dissection was 58 years; 74% of the patients were male; 62% had hypertension; None had Marfan or Ehlers-Danlos syndrome; More than three fourths of the patients had symptoms; 6 patients (14%) presented with aortic rupture; Dissection was limited to the infra-renal aorta in 50% and extended into the iliac or femoral arteries Three patients died before treatment; No patient died after endovascular repair or after open aortic grafting; Mortality following rupture was 67%; Abdominal aortic dissection did not recur but 1 patient died at 14 months as a result of rupture of a thoracic aneurysm.

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Iwasaki et al. [7] reported the case of a 62-years-old woman with spontaneous infrarenal abdominal aortic dissection, which developed into claudication and rest pain in the lower extremity. Multi-row detector computed tomography showed the entry site of the abdominal aortic dissection at the second lumbar artery, while the re-entry site was found intra-operatively at the median sacral artery, indicating that the false lumen had progressed and compressed the true lumen. Iwasaki et al. concluded that a direct approach involving grafting appears to be an effective procedure for resolving mesenteric and lower extremity hypo-perfusion due to aortic dissection with a dilated false channel, even during the acute period.

Iper et al. [8] reported a case with spinal cord ischemia and consecutive paraplegia following spontaneous isolated abdominal aortic dissection (IAAD). A 63-years-old female was admitted to the surgical emergency room with severe lumbar back pain and accompanying paresthesia of both legs. Contrast enhanced computed tomography (CT) of the abdomen showed an infra-renal IAAD in a normal size aorta with patent lumbar arteries. It was assumed that a surgical or interventional approach would not be helpful to improve spinal cord perfusion. In view of this non-operative therapy consisted of lowering blood pressure to prevent further dissection. The patient developed an anterior spinal artery syndrome with permanent paraplegia. Thus, blood pressure was raised for optimal spinal cord perfusion. In order to lower spinal pressure, cerebrospinal fluid drainage was attempted. A three month follow-up CT scan showed spontaneous remodelling of the aorta. The neurological deficit persisted. They concluded that: IAAD is a rare differential diagnosis of lumbar back pain and can be associated with paraplegia as the leading symptom; individualized treatment is indicated; surgical treatment options concerning paraplegia are limited.

Matsuno et al. [9] reported a case of localized dissecting aneurysm originating from the infra-renal abdominal aorta in a 62-years-old man. Open surgical repair was successfully performed without any complication.

Tolva et al. [10] reported a case of SIAAD occurring in the normal aorta of a patient who presented with severe lower back pain radiating to the abdomen, not responding to common pain-killers. A complete exclusion of the dissected aorta was accomplished with a bifurcated endovascular graft using a simple technique. They concluded that endovascular therapy is a safe option and can be considered the treatment of choice even for dissection extending into one or both iliac arteries.

Adam et al. [11] reported a 90-years-old who presented with lower extremity ischaemia due to spontaneous dissection of a non-aneurysmal infra-renal abdominal aorta. The aortic lesion was treated using an aorto-uni-iliac stent graft with contra-lateral common iliac artery occlusion and femoro-femoral cross-over by pass. The patient underwent digital amputation and debridement of the foot four weeks post operatively. At 12 months follow-up, he remained symptom-free with an excluded foot.

Wang et al. [12] reported the treatment of infra-renal abdominal aortic dissection concomitant with an aneurysm. Caronno et al. [13] reported three patients, two men and one woman, with a mean age at diagnosis of 69 years. In all three cases, chest CT scan did not reveal evidence of thoracic aortic dissection. The mean maximal aneurysm diameter was 6.7 +/- 1.5 cm (range 5.5 to 8 cm). All patients underwent stent-graft repair. Follow-up computed tomographic (CT)-angiography examinations were scheduled 1, 4, and 12 months after the procedure. They also reported that stent-graft deployment was successful in all three cases. Intra-operative mortality was not observed. All patients were adequately treated with a bifurcated device. Intensive care unit (ICU) was never required. Mean hospitalization was 4.6 days (range: 4 - 6 days). The mean follow-up was 18 months. No stent-graft complication was observed. They concluded that endovascular repair for isolated infra-renal abdominal aortic dissecting aneurysms, is feasible and effective.

Mart et al. [14] reported the case of an 18-years-old
man who had a fall with blunt abdominal trauma. The patient had hypovolemic shock and findings of acute abdomen. Initial computed tomography (CT) showed pulmonary contusion, pneumothorax, hemoperitoneum, hepatic contusion, right kidney laceration and vascular avulsion, rupture of the mesenteric vein, rupture of the right rectus muscle with bowel hernia, and infra-renal aortic dissection. There were no signs of limb or medullar ischemia. After haemodynamic stabilization and surgical repair of the associated lesions, the dissection was successfully treated with a self-expanding aortic Wallstent. Post-procedure CT scan showed a well positioned patent stent and the patient was discharged asymptomatic. They concluded that per-cutaneous endovascular stent implantation is minimally invasive and seems to be a safe treatment for traumatic dissection of the abdominal aorta.

Nakajima et al. [15] reported the case of a 53-years-old man with renal and bilateral limb ischaemia due to Stanford B aortic dissection. The thrombosis of the false lumen had progressed and compressed the true lumen, developing renal and leg ischemia. Urgent graft replacement of the infra-renal abdominal aorta with proximal fenestration was successfully performed and the patient was discharged without complications. Ghekiere et al. [16] reported dissection of the infra-renal abdominal aorta emanating from blunt trauma.

Garrett and Wolf [17] reported the management of acute infra-renal aortic occlusion secondary to type “A” dissection. They described a technique of immediate reperfusion of the lower extremities through an axillo-bifemoral graft in 2 patients with good results. Baumgartner et al. [18] reported a case of ruptured acute, infra-renal dissection superimposed on a chronic abdominal aortic aneurysm. Orihashi et al. [19] examined 11 consecutive patients with aortic dissection in whom the abdominal aorta was intact, and surgeries were performed with femoral perfusion. The abdominal aorta and visceral branches were examined for new development of dissection or mal-perfusion by means of trans-oesophageal echocardiography before, during, and after cardiopulmonary by-pass. These echocardiographic findings were then related to the post operative assessment and mid-term results. Aortic dissection was found in 3 of 11 cases (27.2%). Unusual progression of metabolic acidosis (base excess < or = 10 mEq/L) occurred, possibly as a sequel of mal-perfusion of visceral arteries in 2 of 3 cases, whereas none of 8 cases presented with such findings. The presence of dissection was later confirmed by post-operative computed tomography in all but 1 case.

In the midterm follow-up period, aneurysm formation was found in the infra-renal aorta and iliac arteries in 2 of the 3 cases with new aortic dissection but not in any of the remaining 8 cases. They concluded that: New development of aortic dissection after formation after femoral arterial perfusion was found in 27% of the cases in this series. Although these occurred without dramatic symptoms, this event may be related to unusual metabolic acidosis during cardiopulmonary bypass or to subsequent aneurismal formation of the infra-renal aorta or iliac arteries or both.

Porcelini et al. [20] in 2005 reported a case of endograft repair of infra-renal abdominal aortic dissection. Farber et al. [21] reported a case of a patient with spontaneous infra-renal abdominal aorta dissection (SIAAD) who presented with claudication. They reviewed the English literature on this disorder and specifically evaluated the differences between patients on the basis of their presenting symptoms. They found that: patients who had SIAAD and lower extremity ischemia were more likely to have the dissection process extend into the iliac or femoral artery and were less likely to have an associated abdominal aortic aneurysm; aortic rupture in the presence of SIAAD was associated with increased risk of death.

Guidicce et al. [22] described how the combined use of duplex and intravascular ultrasound (IVUS) can assist in the evaluation and treatment of isolated abdominal aortic dissection without need for contrast angiography. They reported a 78-years-old man who presented with intermittent bilateral buttock and thigh claudication. Duplex ultrasound and contrast-enhanced computed tomography (CT) confirmed a chronic dissection along 3 to 4 cm of the infra-renal abdominal aorta. During Extra Large Pulmaz stent implantation, the procedure was based on IVUS images and fluoroscopy without angiography. Both duplex and IVUS images were critical in assessing the type and extent of the lesion to be treated in guiding the procedure, and in assessing its satisfactory outcome. They concluded that in selected cases, ultrasound-based imaging modalities can provide most of the information required to accomplish complex aortic procedures.

Frahm et al. [23] reported a case of aorto-iliac occlusion due to descending aortic dissection treated initially with femoro-femoral cross-over bypass and secondarily with unilateral aorto-iliac stenting because of progression of the dissection. A 75-years-old man presented with acute ischemia of the right leg. CT scan revealed occlusion of the right iliac artery due to descending aortic dissection with clotted false lumen. Three days after femoro-femoral cross-over bypass, ischemia of both legs developed and angiography
revealed occlusion of the infra-renal aorta and the left common iliac artery. Two overlapping stents were deployed in these vessel segments. Completion angiography confirmed successful recanalization with adequate distal flow and good patency of the cross-over bypass. The patient's peripheral pulses were restored and his symptoms were alleviated. They concluded that combined treatment with cross-over bypass and endovascular recanalization may be considered as a viable alternative to open aortic surgery in selected cases of complicated aorto-iliac dissection with bilateral leg ischemia.

Lotfi et al. [24] reported an acute spontaneous rupture of an aortic dissection originating in and limited to the infra-renal aorta associated with an infra-renal aortic aneurysm. The diagnosis was established by ultrasonography and computed tomography and was confirmed intra-operatively followed by a successful graft insertion.

Flores et al. [25] in 2002 reported a case of aortic dissection with aneurysmal dilatation (dissecting aneurysm) of the infra-renal abdominal aorta in a 51-years-old female. In addition to the aforementioned reports of infra-renal abdominal aortic dissections between 2002 and 2010 few other cases of infra-renal abdominal dissections / aneurysms have been reported contemporaneously with intra-thoracic aortic dissections and aneurysms in that period and these include the following:

Zipfel et al. [26] reported the case of a 72-years-old man who presented with pericardial tamponade, which was treated with pericardial drainage. A small intramural hematoma of the ascending aorta was found originating from a proximal descending thoracic aneurysm (TAA); he additionally had an infra-renal abdominal aortic aneurysm (AAA). Pursuant to stabilization of the hematoma 7 weeks later, the TAA was repaired with a Relay stent-graft. Type “A” dissection ensued after 3 days and acute rupture of the AAA 6 days later. Emergency surgical repair of both complications achieved successful outcome of an extended 3-stage procedure. They concluded that this case provides insight into the mechanisms that may contribute to stent-graft associated type A dissection. Probably the previous separation of the aortic wall layers by the intramural hematoma triggered the complication; although the aorta appeared to have stabilized.

Lather et al. [27] reported a 64-years-old woman with a history of hypertension dyslipidemia who presented with anaemia, low back pain, and a recent 30-pound weight loss who was found to have inflammatory aneurysm of the thoraco-abdominal aorta with associated dissection.

Tomihara et al. [28] reported a 24-years-old pregnant woman with Marfan’s syndrome delivered by caesarean section during the 38th week of gestation. Even though aortic root dilatation did not increase during pregnancy, three months after delivery the patient noticed a pulsatile abdominal mass. Aortic aneurysm was diagnosed and surgical replacement of the infra-renal abdominal aorta to the common iliac arteries and reconstruction of the inferior mesenteric artery were performed. In addition, the patient developed a Stanford type B thoracic aortic dissection, even after more than four months of beta-blockade.

Li et al. [29] reported that a 65-years-old man developed acute DeBakey type IIIB aortic dissection and was treated medically. The affected aorta dilated progressively, reaching a maximal diameter of 7cm 2 years later. Computed tomography revealed a Crawford type II thoraco-abdominal aortic aneurysm and additional infra-renal abdominal aortic aneurysm below the dissection aorta. The descending thoracic aorta and the abdominal aorta were completely replaced with a Hemashield graft under deep hypothermic circulatory arrest. The postoperative course was complicated with transient left hemiparesis and upper gastrointestinal bleeding which were successfully treated by trans-arterial embolization. They concluded that the results of this case indicate that complete replacement of the descending thoracic and abdominal aorta can adequately and safely treat type III aortic dissection.

Haulon et al. [30] reported that approximately 6 months after the successful implantation of an abdominal aortic endovascular graft, a patient suffered an acute aortic dissection. The false lumen of the dissection terminated in the excluded aneurysm sac, resulting in a lack of outflow. Extreme true lumen compression eliminated blood flow within the distal aorta, resulting in the patient's demise.

Tefera et al. [31] reported that a 73-years-old patient was admitted because of acute descending thoracic and abdominal aortic dissection. He was also found to have an 8-cm infra-renal abdominal aortic aneurysm (AAA). Pursuant to initial medical management of the acute aortic dissection, the patient underwent endoluminal abdominal AAA repair with an AneuRx stent-graft. The completion angiogram showed that the graft was deployed in the false lumen; this complication was treated with fenestration of the intimal flap, establishing flow through both lumens. The patient's recovery was uneventful, and he was discharged on the fourth postoperative day. Follow-up at 1 year with computed tomographic angiography documented a stable descending thoracic aorta with a suggestion of a type II endoleak and no change in the
aneurysm volume. They concluded that this case illustrates the feasibility of endograft repair of infra-renal AAA with a modular stent-graft in the presence of aortic dissection extending below the renal arteries.

Literature review has revealed that when a patient’s symptom is related to loin pain only then the dissection is almost invariably limited to the infra-renal aorta but in cases where the patients’ symptoms include groin pain, iliac fossa pain, or claudication then the iliac arteries/femoral arteries are also involved with the dissection.

Our patient had left loin pain for three days which would be indicative of infra-renal artery dissection but on the third day when his left loin pain shifted to involve his left groin/left iliac fossa would be suggestive of the fact that the dissection had extended to involve the left iliac artery at least. Acute retention of urine has not been reported in relation to infra-renal aortic dissection however, it would be said that acute retention of urine would be indicative of iliac artery involvement of the dissection.

The aetiology of the dissection in our patient cannot be explained. It was known that the patient had been involved in a road traffic accident many years prior to his presentation with the dissection; whether or not he developed a slight intimal damage to his infra-renal artery at the time of his accident cannot be said for certain. The patient had extra corporeal shock wave therapy for a 1-cm calculus in his left renal pelvis two years prior to the diagnosis of his infra-renal abdominal aortic dissection. To our knowledge there has not been any report of aortic dissection complicating extra corporeal shock wave lithotripsy. It would be conjectural to suggest that perhaps the extra corporeal shock wave lithotripsy two years earlier may have induced a sub-clinical intimal damage to the infra-renal aorta which eventually after two years has resulted in the infra-renal abdominal aorta dissection.

Intravenous Urography (Excretory Urography [IVU]) has been used for many years in the investigation of ureteric colic. However, the disadvantage of IVU is that it can be used to confirm the diagnosis of a calculus in the renal tract and obstruction but it cannot be used to confirm the diagnosis of extra renal tract conditions that mimic ureteric colic. If IVU had been done instead of CT scan in the investigation of this patient a normal IVU would have been reported and the diagnosis of infra-renal aortic dissection would have been missed. The advantage of CT scan in the initial investigation of renal/ureteric colic is that it can be used to investigate renal tract pathology as well as extra renal tract pathology. The availability of CT scan in our hospital for the immediate investigation of loin

pain/renal colic enabled us quickly to establish the diagnosis of infra-renal abdominal aorta dissection and to hand over the patient to the vascular surgical team on call to take over the management of the patient quickly without any undue delay.

Conclusions

The availability of CT scan for the immediate investigation of loin pain/renal colic would help the urologist to quickly differentiate between renal tract pathology and extra renal tract pathology mimicking renal tract pathology. In this case, the choice of CT scan as the first radiological investigation of loin to groin pain has enabled us to quickly establish the diagnosis of infra-renal abdominal aortic dissection. Perhaps if this patient had had intravenous urogram for his symptoms the diagnosis would have been missed because the investigation would be normal. We would recommend that if practicable all urology and radiology departments should adopt the use of CT scan as the first radiological modality of choice in the investigation of renal/ureteric colic.

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References

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Illustrations

Illustration 1

CT scan showing infra-renal abdominal aorta dissection

Illustration 2

CT scan showing dissection of the infra-renal abdominal aorta has extended to involve the iliac arteries
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