

Aorto-left Renal Cyst Fistula: A Rare Complication of Abdominal Aortic Aneurysm Rupture

Yu-Hui Chiu^{1,2,5}, Jen-Dar Chen^{3,5*}, Tze-Fan Chao^{4,5}, Chong-Kuang How^{2,5}, Carlos Lam¹,
David Hung-Tsang Yen^{2,5}, Chun-I Huang^{2,5}

¹Department of Emergency Medicine, Taipei Medical University–Wan Fang Hospital,
²Departments of Emergency Medicine, ³Radiology, and ⁴Internal Medicine, Taipei Veterans General Hospital,
and ⁵National Yang-Ming University School of Medicine, Taipei, Taiwan, R.O.C.

Abdominal aortic aneurysm (AAA) rupture can occur in different ways, such as closed rupture into the retroperitoneum, open rupture into the peritoneal cavity, rupture into surrounding hollow structures, and chronic contained or sealed rupture. Here, we report an unusual case of spontaneous rupture of AAA into a renal cyst that presented with hematuria, abdominal pain and shock, and which was diagnosed with multidetector computed tomography. We also review the literature on unusual patterns of AAA rupture. [*J Chin Med Assoc* 2009;72(10):551–554]

Key Words: abdominal aortic aneurysm, aortoenteric fistula, aortovenous fistula, chronic contained or sealed rupture, renal cyst

Introduction

Rupture of abdominal aortic aneurysm (AAA) is the 13th leading cause of death in the United States.¹ The mortality rate is as high as 77–94%.² The classic clinical triad includes abdominal pain, a pulsatile abdominal mass and shock.¹ Some rare complications and atypical presentations of this disease may be encountered in the emergency department and therefore result in missed or delayed diagnosis. We present an unusual case of spontaneous rupture of AAA into a renal cyst, and review the literature on unusual presentations of AAA rupture.

Case Report

A 77-year-old man presented to our emergency department with symptoms of dyspnea and chest tightness. He had a history of an infrarenal AAA, measuring 4.9 cm in maximum diameter, 4 months previously, non-critical valvular aortic stenosis with congestive heart failure, chronic renal insufficiency being treated with hemodialysis, and hypertension. The patient complained of sudden onset of severe low back pain

during hospitalization. Vital signs were: blood pressure of 52/36 mmHg, pulse rate of 126/min, respiration rate of 18/min, and body temperature of 36.3°C. Physical examination revealed a pulsatile abdominal mass, diffuse abdominal tenderness and knocking tenderness over the left costovertebral angle. The patient's hemoglobin level dropped from 9.1 to 6.4 g/dL within 10 hours. Abdominal computed tomography (CT) was performed and demonstrated a ruptured AAA 10 cm in diameter with surrounding retroperitoneal hematoma draining into a renal cyst in the left kidney (Figure 1). Emergency surgery confirmed the CT findings. Surgical repair of the ruptured infrarenal AAA was performed successfully. However, the patient died 1 month later due to pneumonia-related septic shock.

Discussion

AAA rupture can occur in different ways, such as closed rupture into the retroperitoneum (most commonly), open rupture into the peritoneal cavity, rupture into surrounding hollow structures (e.g. vein, gastrointestinal tract, urinary tract), and chronic contained



*Correspondence to: Dr Jen-Dar Chen, Department of Radiology, Taipei Veterans General Hospital, 201, Section 2, Shih-Pai Road, Taipei 112, Taiwan, R.O.C.
E-mail: jdchen@vghtpe.gov.tw • Received: February 11, 2009 • Accepted: July 14, 2009

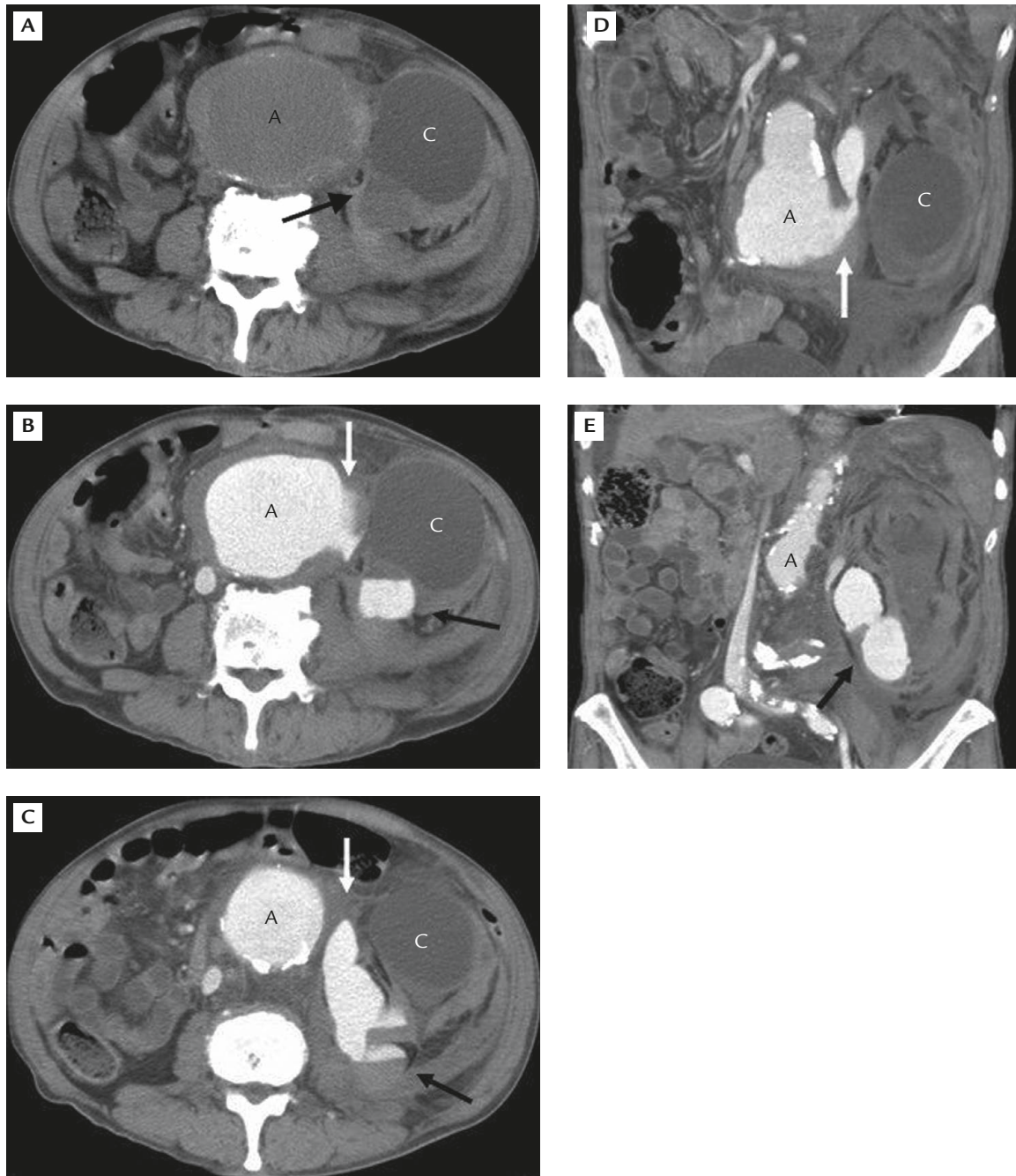


Figure 1. A huge fusiform infrarenal abdominal aortic aneurysm (“A”), measuring 10 cm in greatest diameter and 11 cm in involved length, with rupture into the left retroperitoneum with lobulated contrast medium accumulation over the left paraspsoas region, communicating with a renal cyst over the lower portion of the left kidney, surrounded by much retroperitoneal hematoma. (A) Non-contrast computed tomography demonstrates a fluid-blood level within a renal cyst (black arrow). C=another large renal cyst. (B, C) Active extravasated contrast medium communicating with a left renal cyst (white arrows). Contrast medium extravasation from the rupture site of the abdominal aortic aneurysm (“A”) and a renal cyst filled with extravasated contrast medium (black arrows) adjacent to another huge renal cyst (“C”). (D, E) Coronal reconstructed computed tomography reveals contrast medium extravasation from the abdominal aortic aneurysm (“A”) (white arrows) communicating into a renal cyst (black arrows). C=another large renal cyst.

or sealed rupture.^{3,4} The incidences of these rupture complications of AAA (2.0–4.0% for aortocaval fistula,^{5,6} 1.5–4.0% for aortoenteric fistula,^{7,8} 4% for chronic contained rupture),^{9,10} and complications of

rupture into surrounding hollow structures, and atypical presentations by chronic or sealed contained rupture are reported in the literature. We used PubMed to search the English-language literature for case reports

Table 1. Unusual complications of abdominal aortic aneurysm rupture reported in the English-language literature

Complications	n (%)
Aortovenous fistula	41 (100)
Inferior vena cava	33 (80.5)
Inferior mesenteric vein	1 (2.4)
Left renal vein	7 (17.1)
Aortoenteric fistula	39 (100)
Stomach	1 (2.6)
Duodenum	31 (79.5)
Jejunum	1 (2.6)
Ileum	1 (2.6)
Appendix	1 (2.6)
Transverse colon	1 (2.6)
Sigmoid colon	3 (7.7)
Chronic contained or sealed rupture	20 (100)
Rib	1 (5)
Vertebrae	15 (75)
Psoas muscle	4 (20)
Rupture into urinary tract	2 (100)
Bladder	1 (50)
Ureter	1 (50)

published between 1998 and 2008 on AAA rupture with uncommon complications and atypical presentations. Ninety articles consisting of 101 cases were collected. We categorized these cases by the involved organ systems into: (1) AAA rupture with aortovenous fistula; (2) AAA rupture with aortoenteric fistula; (3) AAA rupture into urinary tract; and (4) chronic contained or sealed rupture (Table 1). Aortovenous and aortoenteric fistulae were the 2 most common types (40.2% and 38.2%, respectively). In aortovenous fistula, rupturing into the inferior vena cava was the most common type (about 80.5%). In aortoenteric fistula, rupturing into the duodenum was the most common (about 79.5%). In chronic contained or sealed rupture, the vertebrae was the most commonly involved site (75%). Rupturing into the urinary tract was the rarest complication of AAA rupture.

The classic clinical triad of AAA rupture that includes abdominal pain, pulsatile abdominal mass and shock was reported in up to 50% of patients.^{1,11} However, there are a number of atypical presentations reported in the literature, such as a machinery murmur for aortocaval fistula,^{5,12} gastrointestinal bleeding for aortoenteric fistula,^{7,13} and hematuria for aorta-left renal vein fistula,^{14,15} aortovesical fistula¹⁶ or aortoureteral fistula.¹⁷ Jones et al¹⁸ reported that the characteristic findings in patients with chronic contained rupture were: (1) presence of an AAA; (2) previous symptoms of back, scrotum or groin pain;

(3) symptoms attributed to compressive or erosive effect of the aneurysm upon vertebrae, ribs, psoas muscle or other paraspinal structures; (4) in stable condition with normal hematocrit; (5) CT shows retroperitoneal hematoma; and (6) pathological confirmation of organized hematoma.^{3,10,18,19}

To our knowledge, ours is the first report of a ruptured AAA with surrounding hematoma draining into a renal cyst. Similar to other cases of AAA rupture into the urinary tract or left renal vein, this case also presented with hematuria, low back pain and a pulsatile abdominal mass. The CT images revealed active extravasation of contrast medium communicating with a left renal cyst. Due to the extremely rare incidence of AAA rupturing into the urinary tract, we thought the treatment of aortorenal cyst fistula might be similar to the management of aortoenteric fistula. After an arterial bypass using a prosthetic graft for ruptured AAA, omentum coverage and aggressive antibiotic treatment for preventing the high infection rate of the graft are suggested.^{16,17} Resection of the involved renal cyst may also be considered.

In conclusion, AAA rupture is a life-threatening condition which needs emergent surgical repair. Immediate diagnosis and management are real challenges for emergency physicians. The purpose of this article is to provide essential information on the typical and atypical characteristics of AAA rupture.

References

- Schwartz SA, Taljanovic MS, Smyth S, O'Brien MJ, Rogers LF. CT findings of rupture, impending rupture, and contained rupture of abdominal aortic aneurysms. *AJR Am J Roentgenol* 2007;188:57-62.
- Siegel CL, Cohan RH. CT of abdominal aortic aneurysms. *AJR Am J Roentgenol* 1994;163:17-29.
- Davidovic LB, Lotina SI, Cinara IS, Zdravkovic DjM, Simic TA, Djoric PL. Chronic rupture of abdominal aortic aneurysms. *Srp Arh Celok Lek* 1998;126:177-82. [In Serbian]
- Kapoor V, Kanal E, Fukui MB. Vertebral mass resulting from a chronic-contained rupture of an abdominal aortic aneurysm repair graft. *AJNR Am J Neuroradiol* 2001;22:1775-7.
- Taniyasu N, Tokunaga H. Multiple aortocaval fistulas associated with a ruptured abdominal aneurysm in a patient with Ehlers-Danlos syndrome. *Jpn Circ J* 1999;63:564-6.
- Fukuda I, Minakawa M, Fukui K, Suzuki Y. Management of an aorto-caval fistula from a ruptured aortic false aneurysm using a covered stent graft. *Interact Cardiovasc Thorac Surg* 2007; 6:682-4.
- Aksoy M, Yanar H, Taviloglu K, Ertekin C, Ayalp K, Yanar F, Guloglu R, et al. Rupture of abdominal aortic aneurysm into sigmoid colon: a case report. *World J Gastroenterol* 2006; 12:7549-50.
- Bruns C, Kristen F, Walter M. Aortocolic fistula as a rare complication of aorto-iliac aneurysms. *Vasa* 1995;24:354-61. [In German]

9. Bansal M, Thukral BB, Malik A. Contained rupture of a thoracoabdominal aortic aneurysm presenting as a back mass. *J Thorac Imaging* 2006;21:219–21.
10. Galessiere PF, Downs AR, Greenberg HM. Chronic, contained rupture of aortic aneurysms associated with vertebral erosion. *Can J Surg* 1994;37:23–8.
11. Crawford CM, Hurtgen-Grace K, Talarico E, Marley J. Abdominal aortic aneurysm: an illustrated narrative review. *J Manipulative Physiol Ther* 2003;26:184–95.
12. Alexander JJ, Imbembo AL. Aorta-vena cava fistula. *Surgery* 1989;105:1–12.
13. Kassum D, Kim S, Shojania AM, Kirkpatrick JR. Aortocolic fistula: a rare cause of profuse rectal bleeding. *Can J Surg* 1983;26:293–5.
14. Sultan S, Madhavan P, Colgan MP, Hughes N, Doyle M, Malloy M, Moore D, et al. Aorto-left renal vein fistula: is there a place for endovascular management? *J Endovasc Surg* 1999;6:375–7.
15. Yagdi T, Atay Y, Engin C, Ozbek SS, Buket S. Aorta-left renal vein fistula in a woman. *Tex Heart Inst J* 2004;31:435–8.
16. Kang SJ, Kim DI, Huh SH, Lee BB, Kim DK, Do YS. Coexisting aortocolic and aortovesical fistulae in an abdominal aortic aneurysm: report of a case. *Surg Today* 2003;33:441–3.
17. Georgopoulos SE, Arvanitis DP, Tekerlekis P, Chronopoulos A, Kostakopoulos A. Rupture of an aortic anastomotic aneurysm into a ureter. *Urol Int* 2003;71:333–5.
18. Jones CS, Reilly MK, Dalsing MC, Glover JL. Chronic contained rupture of abdominal aortic aneurysms. *Arch Surg* 1986;121:542–6.
19. Saiki M, Urata Y, Katoh I, Hamasaki T. Chronic contained rupture of an abdominal aortic aneurysm with vertebral erosion: report of a case. *Ann Thorac Cardiovasc Surg* 2006;12:300–2.