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Case report

Ruptured mycotic iliac artery aneurysm presenting as infected psoas haematoma and mimicking psoas abscess ☆,☆☆

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ABSTRACT

Pseudoaneurysm of the iliac arteries are rarely reported in the literature. Failure to identify the pathology may delay the necessary treatment, and potentially lead to high mortality. We report a case of ruptured mycotic iliac artery aneurysm in a 46-year-old man with newly diagnosed diabetes mellitus. Initial CT appearance mimicked psoas abscess. However, further CT showed features more suggestive of a psoas haematoma with heterogeneous hyperdensities within the lesion. A ruptured mycotic iliac artery aneurysm was diagnosed. Patient was urgently referred to the vascular team for endovascular stenting. Blood-stained purulent material was noted in the left psoas muscle intra-operatively. It was drained and sent for culture, which later yielded Salmonella Enteritidis sensitive to cefotaxime. We present this case to highlight the importance of reviewing any pre-contrast intramuscular hyperdensities which may suggest acute blood content, and raise suspicion of adjacent vascular pathologies.

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Introduction

A blood vessel contains three layers, the innermost layer tunica intima, middle layer tunica media, and the outermost layer tunica adventitia. Aneurysm is focal dilatation of a blood vessel with all 3 arterial wall layers intact. On the contrary, pseudoaneurysm (false aneurysm) is a contained rupture of an artery due to disruption of wall continuity of tunica intima and media, while still bound by the outermost layer tunica adventitia. Mycotic aneurysm arises from bacterial infection of an arterial vessel and could result in disruption of vessel integrity. Formation and progression of such pseudoaneurysm may lead to blood vessel rupture, which could give

rise to severe complications, depending on the size and site involved. For the common iliac artery, pseudoaneurysm and its rupture could result in mortality rate as high as 50% [1].

Psoas haematoma could be one of the complications of common iliac artery pseudoaneurysm, although the entity is more commonly caused by trauma, coagulopathy, ruptured abdominal aortic aneurysm, post-operation, post-biopsy, connective tissue disorders, vasculitis or vessel injury due to tumor. Psoas haematoma could result in heavy bleeding due to its deep retroperitoneal position. It is not only important to identify the condition itself, but also essential that the underlying cause be recognized, as this holds the key to the correct management for life-saving purpose.

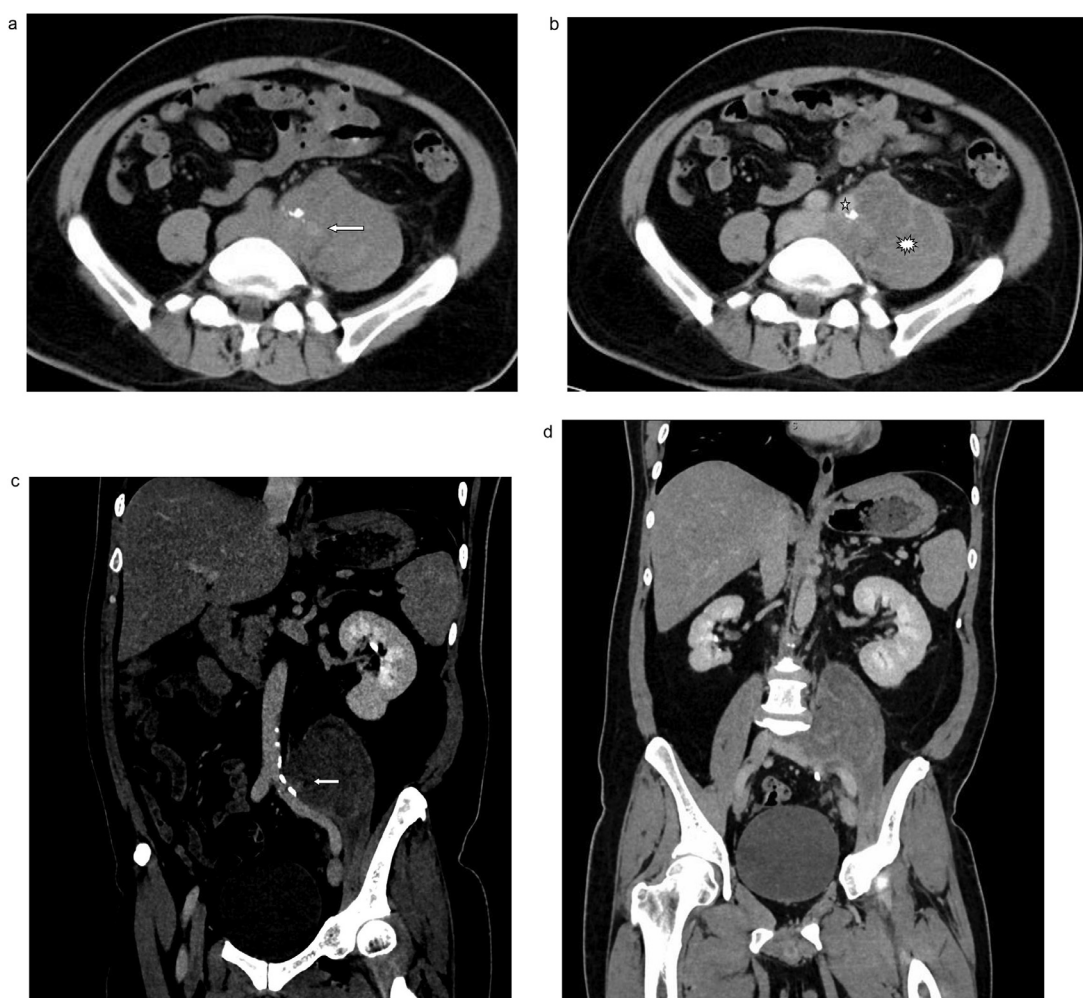


Fig. 1 – (A) Pre-contrast CT abdomen and pelvis, axial. The left psoas muscle is swollen compared to the right. Heterogeneous high density area (arrow) is seen within the swollen left psoas muscle at pre-contrast scan. **(B)** Portovenous phase CT abdomen and pelvis, axial. Post-contrast scan shows the swollen left psoas muscle (asterisk) abuts to the left common iliac artery (star) with no intervening fat plane seen. Comparing to the contralateral normal side, the fat plane between the right psoas muscle and the right common iliac artery is preserved. There is no contrast enhancement nor gas pockets within the left psoas muscle. The heterogeneous high density area inside the left psoas muscle seen at pre-contrast shows no contrast enhancement at portovenous phase. This raises suspicion of acute blood content. **(C)** Portovenous phase CT abdomen and pelvis, coronal. **(D)** Portovenous phase CT abdomen and pelvis, coronal. **(C–D)** Portovenous phase shows the swollen left psoas muscle with heterogeneous densities inside. Subtle hyperdensities (Fig. 3 arrow) are seen lateral to the left common iliac artery, inside the swollen left psoas muscle.

We present this case to highlight the significance of considering a vascular cause when a psoas haematoma is encountered. We also discuss how a psoas haematoma can mimic a psoas abscess, and how we can differentiate them radiologically.

Case report

A 46-year old man, with newly diagnosed diabetes mellitus, presented with on and off fever for 10 days. He had no localized symptoms. Initial physical examination was unremarkable. Blood test on admission showed leucocytosis (white blood cell: $14.1 \times 10^9/L$). Haemoglobin level was normal (Haemoglobin: 13.6 g/dL). Septic workup showed no growth from blood culture and urine culture. Chest radiograph was clear. Nasopharyngeal aspirate for coronavirus was negative.

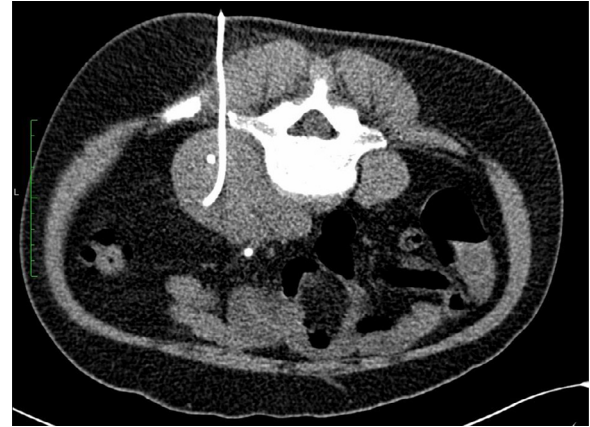


Fig. 2 – CT-guided drainage for the left psoas swelling

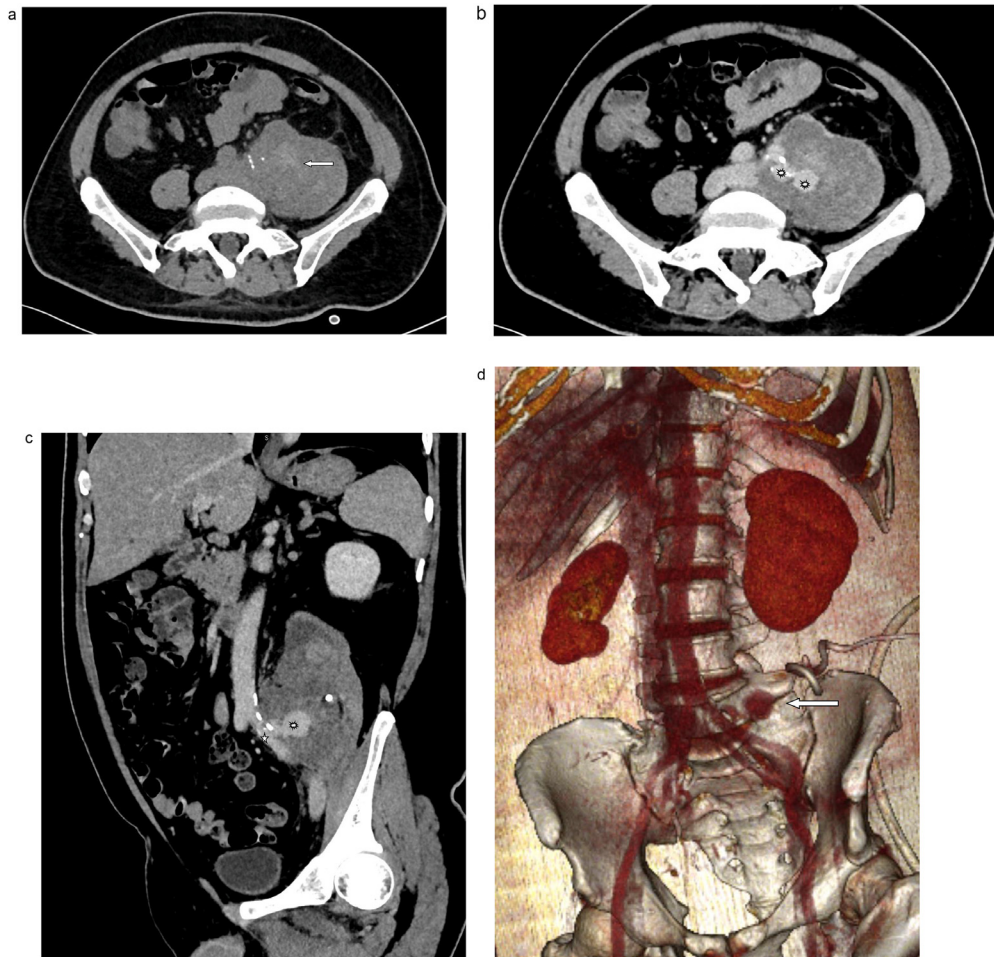


Fig. 3 – (A) Pre-contrast CT abdomen and pelvis, axial (CT 4 days after initial one). There are again hyperdensities seen within the swollen left psoas muscle, which suggest acute blood content (arrow). Comparing with CT 4 days ago, the left psoas lesion shows interval enlargement. Features are suggestive of left psoas haematoma. (B) Portovenous phase CT abdomen and pelvis, axial (performed 4 days after initial CT). Post-contrast scan shows active contrast extravasation into a pseudoaneurysm with 3 mm pseudoaneurysm neck seen at posterior aspect of left common iliac artery. (C) Portovenous phase CT abdomen and pelvis, 3D oblique reformatted. 3D oblique reformatted image shows left common iliac artery (star) with active contrast extravasation into a pseudoaneurysm (asterisk) within the left psoas haematoma. (D) Volume Rendering Image. Volume rendering image shows a pseudoaneurysm (arrow) from left common iliac artery. The tip of the pigtail drainage catheter is away from the pseudoaneurysm.

Table 1 – Comparison of radiological features of psoas haematoma and psoas abscess.

	Psoas haematoma	Psoas abscess
Pre-contrast attenuation	Hyperdense	Hypodense
Presence of gas	Possible	Seldom
Peripheral enhancement	Usually present	Seldom

In spite of empirical antibiotics of co-amoxiclav then piperacillin-tazobactam, fever persisted. Six days after admission, he developed left hip pain. Physical examination revealed positive femoral stretch test with the psoas sign. Blood test showed normalized white blood cell (white blood cell: $7.7 \times 10^9/L$) while haemoglobin level mildly dropped from 13.6g/dL to 11.8 g/dL. Erythrocyte sedimentation rate (ESR) was raised (ESR: 98 mm/h). Patient was haemodynamically stable. There was no documented per-rectal bleeding or other source of bleeding. There was no trauma history. Patient was not on any anticoagulants. Blood test for international normalized ratio (INR) was normal (INR: 1.2). Because of the positive femoral stretch test and psoas sign, he was suspected to have left psoas pathology. Infective cause was the top differential diagnosis in view of persistent fever and raised ESR.

Urgent contrast CT abdomen and pelvis was performed (Figs. 1A–D), which showed swollen left psoas muscle with heterogeneous high densities inside without contrast enhancement. No internal gas pockets were seen. The swollen left psoas muscle abutted the left common iliac artery with no intervening fat plane seen.

At that time, radiographic diagnosis of left psoas abscess was made. After that, the patient was referred to the Radiology Department for CT-guided drainage on the same day (Fig. 2). Before performing the drainage, the radiologist remarked that there were hyperdensities inside the left psoas muscle at the pre-contrast scan, suggestive of acute blood content. The left psoas lesion was then drained with a 8F pigtail catheter through posterior para-spinal approach. Old blood was drained and sent for culture, which later yielded *Salmonella Enteritidis* sensitive to cefotaxime.

However, patient was noted to have persistent blood-stained output (20 – 70 mL/ d) from the pigtail catheter for 4 days after the drainage. Haemoglobin level remained stable in the range of 11.6 – 12.0 g/dL. Patient did not require blood transfusion. He was then referred to the Radiology Department for another urgent contrast CT abdomen and pelvis (Figs. 3A–D).

The scan showed interval enlargement of the left psoas muscle. Internal hyperdensities within the swollen muscle became more obvious, which suggested left psoas haematoma. Post-contrast scan showed active contrast extravasation into a pseudoaneurysm (Fig. 3B asterisk) within the left psoas haematoma. A 3 mm pseudoaneurysm neck was seen at the posterior aspect of left common iliac artery (Fig. 3B arrow). The left psoas haematoma encased (greater than 180 degrees) the left common iliac artery (Fig. 6B). The lesion was less obvious in the first set of CT; this could be due to early formation of the pseudoaneurysm which could have been difficult for optimal opacification. Diagnosis of rup-



Fig. 4 – Digital subtraction angiography during operation (Endovascular stenting of the abdominal aorta and coil embolization to the left internal iliac artery) There is no contrast extravasation or pseudoaneurysm detected from the left common iliac artery. This shows uneventful operation.

tured mycotic aneurysm of the left common iliac artery was made.

In view of the critical findings, the referring clinician was informed at once. Patient was transferred to a vascular centre urgently for further management. Emergency operation was arranged on the same day by the vascular team. Endovascular stenting of the abdominal aorta and coil embolization to the left internal iliac artery was performed (Fig. 4). Retroperitoneal exploration showed blood-stained purulent material in the left psoas muscle. It was drained and sent for culture, which later yielded *Salmonella Enteritidis* sensitive to cefotaxime.

After insertion of endovascular stents from the abdominal aorta to the right common iliac artery, left common and left external iliac artery, the infectious disease team recommended lifelong antibiotics with co-trimoxazole. Also, the newly diagnosed diabetes mellitus is a known risk factor for *Salmonella Enteritidis* infection, which was likely the predis-

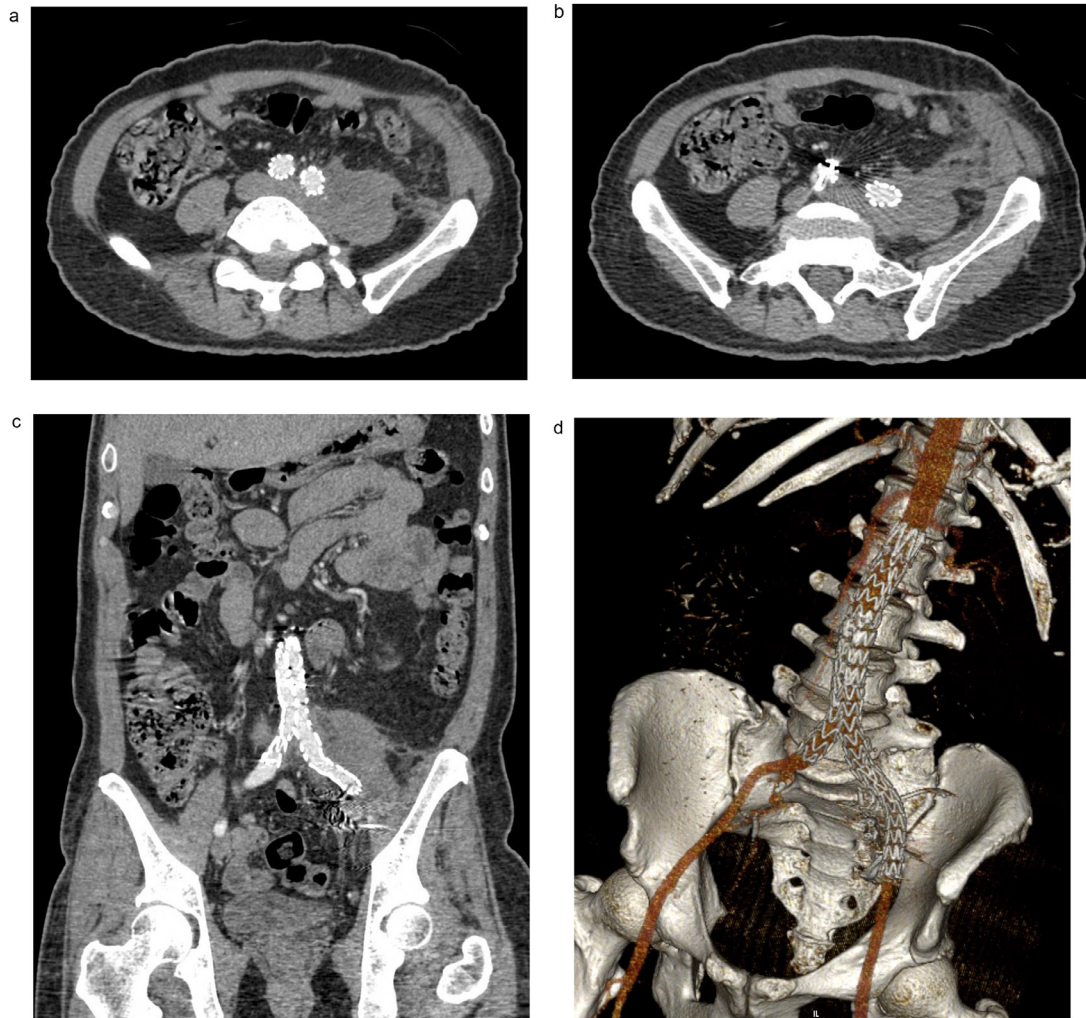


Fig. 5 – (A) Post-contrast CT abdomen and pelvis, axial (2 months after operation). (B) Post-contrast CT abdomen and pelvis, axial (2 months after operation). (C) Portovenous phase CT abdomen and pelvis, coronal (2 months after operation). (D) Volume Rendering image (2 months after operation) Contrast CT shows there is no contrast extravasation or pseudoaneurysm detected from the left common iliac artery. There is no evidence of endoleak.

posing factor for pseudoaneurysm formation in this patient. He was started on oral hypoglycaemic agent metformin to optimize glycaemic control.

A follow-up contrast CT abdomen and pelvis was performed about 2 months after the operation (Figs. 5A–D), showing evidence of previous endovascular stenting of abdominal aorta to right common iliac artery, left common and left external iliac artery. Embolization material was seen at the left internal iliac artery. There was no evidence of endoleak. No contrast extravasation or pseudoaneurysm was detected from the left common iliac artery. There was also significant shrinkage of the left psoas haematoma comparing with previous CT.

Discussion

In this case, the psoas haematoma was resulted from ruptured mycotic aneurysm of the left common iliac artery, which is a rare cause. Other commoner causes of psoas haematoma include trauma, coagulopathy, ruptured abdom-

inal aortic aneurysm, post-operation, post-biopsy, connective tissue disorders, vasculitis or vessel injury due to tumor [2]. Our patient has no recent history of trauma and is not on anticoagulation. Subsequently, he was found to have Salmonella infection at the psoas haematoma, with the background of newly diagnosed diabetes mellitus.

Presenting clinical features of both psoas abscess and haematoma are often non-specific [3]. Common clinical presentations of psoas haematoma include groin or thigh pain [4]. More sizeable psoas haematoma may exert mass effect onto the femoral nerve passing through the muscle, resulting in compressive femoral neuropathy [5]. If there is active bleeding in the psoas haematoma, the patient can even present with unstable haemodynamics.

For radiological features, both psoas haematoma and abscess would present with psoas muscle enlargement [6]. However, there are some differences between psoas haematoma and psoas abscess. Firstly, acute psoas haematoma is expected to contain pre-contrast hyperdensities, which suggests acute blood content. Psoas abscess would be expected to be hypo-

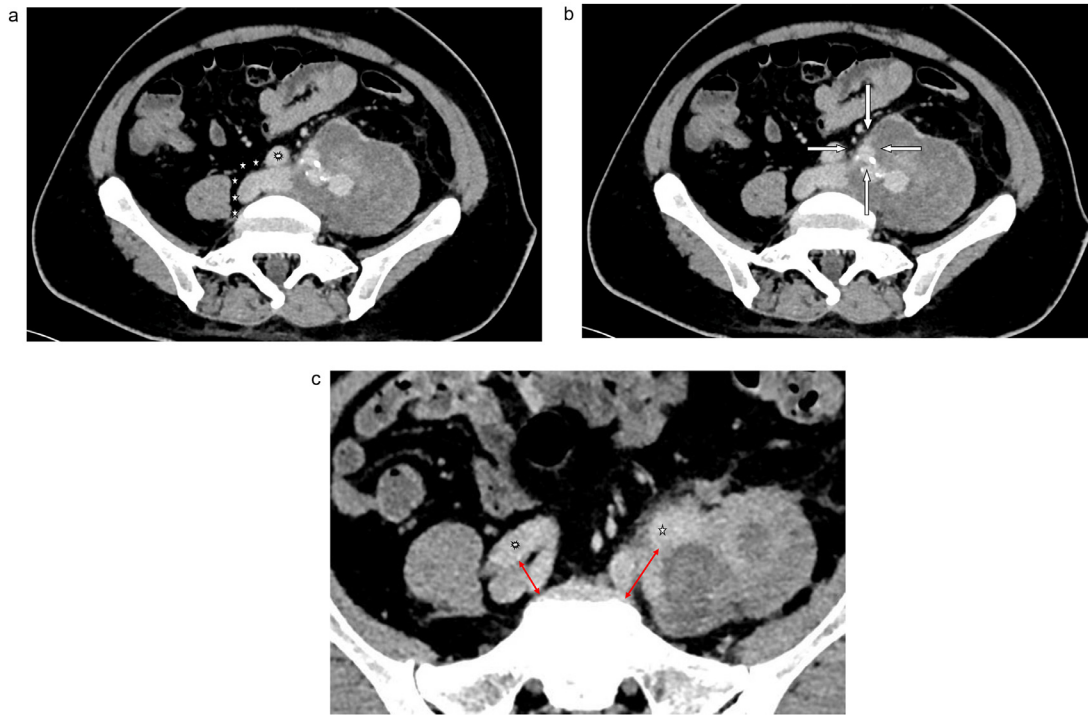


Fig. 6 – (A) (CT scan before operation). Preserved fat plane (star) between right psoas muscle (arrow) and right common iliac artery (asterisk). The right side is normal. (B) (CT scan before operation) Encasement (greater than 180 degrees) of left common iliac artery (arrow) by left psoas haematoma. (No intervening fat plane between). (C) (CT scan before operation) The left common iliac artery is mildly elevated from the vertebral body compared to right side. The right common iliac artery is not elevated from the vertebral body. (asterisk: right common iliac artery; star: left common iliac artery).

dense in pre-contrast scan. Secondly, presence of gas may be found in psoas abscess but seldom seen in psoas haematoma. Thirdly, peripheral enhancement is usually present in psoas abscess but seldom seen in psoas haematoma. (Table 1)

In our case, there were 2 more signs present in the psoas haematoma which pointed towards common iliac artery pseudoaneurysm, but not psoas abscess. Firstly, the left psoas haematoma encased (greater than 180 degrees) the left common iliac artery (Fig. 6B). Secondly, the common iliac artery was mildly elevated from the vertebral body compared to the contralateral side (Fig. 6C), resulted from the mass effect of the haematoma, which pushed the common iliac artery further away from the vertebral body. In contrast, the fat plane between psoas muscle and common iliac artery may be preserved in psoas abscess. There may not be elevation of iliac artery from the vertebral body in psoas abscess either.

Psoas haematoma is an important diagnosis that we fear to miss. It is an easy mimic of psoas abscess. Their management would be entirely different. For psoas abscess, the treatment includes antibiotics, image-guided drainage or surgical drainage. For psoas haematoma, treatment would depend on the cause of psoas haematoma. Drainage would be disastrous if the lumen of pseudoaneurysm is punctured. In our case, the patient had endovascular treatment to the left common iliac artery pseudoaneurysm. Other treatment options for iliac artery pseudoaneurysm include thrombin injection, or traditional open surgery.

Regarding diagnostic difficulties, the hyperdensities posterolateral to the left common iliac artery (Figs. 1B and C ar-

rows) were overlooked at the initial contrast CT and were not reported. Psoas abscess as the initial diagnosis was made. As a result, patient was referred to the Radiology Department for CT-guided drainage on the same day of the initial CT. This case has been a learning lesion for us that even subtle pre-contrast hyperdensities should raise suspicion for the presence of acute blood content in a lesion. Also, we should always consider vascular origin as one of causes of haematoma formation. Even at the intervention session, it is still important to review the diagnostic images to reconfirm the indication for invasive procedure before proceeding.

Conclusion

Pseudoaneurysm of common iliac artery is rare, and associated with high mortality rate. Our patient had ruptured mycotic aneurysm of the left common iliac artery, presenting as infected left psoas haematoma. Infected psoas haematoma is an easy mimic for psoas abscess. Their management is entirely different. We should always read carefully the pre-contrast image for any hyperdense acute blood for psoas pathology. Once pseudoaneurysm of common iliac artery is diagnosed, vascular team referral is warranted for urgent surgical intervention.

Ethics approval

This study was conducted in accordance with the principles outlined in the Declaration of Helsinki.

Patient Consent

Informed consent was obtained for the purpose of case study.

Declaration

This article has not been published, or posted online before.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.radcr.2021.09.014](https://doi.org/10.1016/j.radcr.2021.09.014).

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