Case 17931

Eurorad

Bilateral adrenal infarction complicating abdominal sepsis

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Section: Abdominal imaging
Area of Interest: Abdomen
Imaging Technique: CT
Imaging Technique: MR
Case Type: Clinical Cases
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Patient: 75 years, female

Clinical History:

A 75-year-old female presented with large pericolic abscesses related to perforated sigmoid diverticulitis. Management included intravenous antibiotics and percutaneous pelvic drains. Serial imaging demonstrated persistent collections but otherwise normal solid intra-abdominal viscera. A day 14 CT showed grossly abnormal adrenal glands, further assessed with MRI the following day.

Imaging Findings:

Day 14 portal venous phase CT abdomen and pelvis demonstrated new enlargement of bilateral adrenal glands (figure 1) compared with normal appearance of the adrenals two days prior (figure 2). There was heterogeneous attenuation of the adrenal glands, with the right measuring up to 3.6cm and the left 4.2cm, highly suggestive of bilateral adrenal haemorrhage or infarction. MRI the following day showed cystic change within the adrenal glands and an absence of enhancement on arterial phase sequence, without evidence of haemorrhage (figures 3 and 4). Based on imaging, a diagnosis of non-haemorrhagic BAI was made.

Further portal venous phase CT scans 12 and 20 days post-infarction showed persistent adrenal gland enlargement, without evidence of haemorrhage or atrophy.

Discussion:

Bilateral adrenal infarction (BAI) is a rare complication of sepsis which can lead to adrenal insufficiency and is usually associated with venous thrombosis or microvascular thrombosis of the adrenal parenchyma. BAI can lead to adrenal insufficiency with risk of adrenal crisis, coma, and death, particularly if replacement steroid therapy is delayed. Venous thrombosis of the main adrenal vein is suggested as the common cause of adrenal infarction and related to the fact that although the adrenal gland has three supplying arteries there is a single draining vein [1-3]. Bilateral adrenal haemorrhage is a more common, although still rare, cause of adrenal insufficiency with an overall mortality of 15% despite treatment, rising to 50% in the setting of sepsis [4]. Clinical presentation may be non-specific, with symptoms including abdominal, back or flank pain [1], necessitating radiological diagnosis.

Findings of adrenal infarction were unexpected in this case, with no symptoms present to raise suspicion of an adrenal insult. Although rare, treatment should be prompt upon diagnosis due to the risk of adrenal insufficiency and it's associated high mortality rate [1, 2]. The pathophysiology of adrenal haemorrhage in this patient is uncertain. No evidence of thrombosis, atrophy or haemorrhage were present on follow-up imaging performed 20 days post-infarction. Given the risk of hypercoagulable state in sepsis [5], this is a possibility in our case. However, given that the infarction is bilateral and absence of evidence of venous thrombosis on CT or MR imaging, hypotension, is considered the most likely causative factor, with or without the co-existence of micro-thrombosis.

Our findings are consistent with prior findings in the literature of adrenal enlargement with internal cystic change in the absence of internal haemorrhage [1, 3]. CT and MRI are useful in characterising adrenal haemorrhage and should be performed promptly if there is reasonable clinical suspicion.

Written informed patient consent for publication has been obtained.

Differential Diagnosis List: Bilateral adrenal infarction without adrenal haemorrhage, Bilateral adrenal gland haemorrhage , Adrenal gland metastases , Venous infarction of the adrenal glands , Hypotension-induced infarction of bilateral adrenal glands

Final Diagnosis: Bilateral adrenal infarction without adrenal haemorrhage

References:

Chagué, P., et al., Non-Hemorrhagic Adrenal Infarction during Pregnancy: The Diagnostic Imaging Keys. Tomography, 2021. 7(4): p. 533-544 (PMID: 34698296).
Fox, B., Venous infarction of the adrenal glands. J Pathol, 1976. 119(2): p. 65-89 (PMID:932879).
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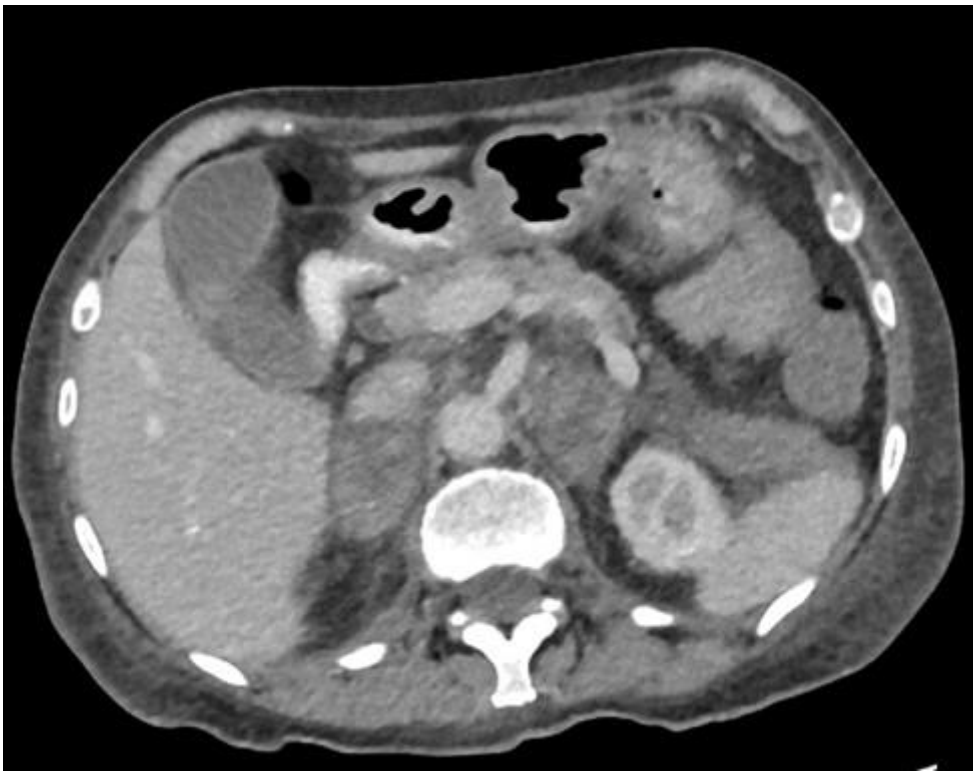
Di Serafino, M., et al., Nontraumatic adrenal hemorrhage: the adrenal stress. Radiol Case Rep, 2017. 12(3): p. 483-487 (PMID: 28828107).
Semeraro, N., et al., Coagulopathy of Acute Sepsis. Semin Thromb Hemost, 2015. 41(6): p. 650-8 (PMID:26305237).

Figure 1

a



Description: Portal venous phase axial (a) and coronal (b) CT imaging of bilateral adrenal glands on day 12 of admission **Origin:** Department of Radiology, Beacon Hospital, Dublin, Ireland 2022

b

Description: Portal venous phase axial (a) and coronal (b) CT imaging of bilateral adrenal glands on day 12 of admission **Origin:** Department of Radiology, Beacon Hospital, Dublin, Ireland 2022

Figure 2

a

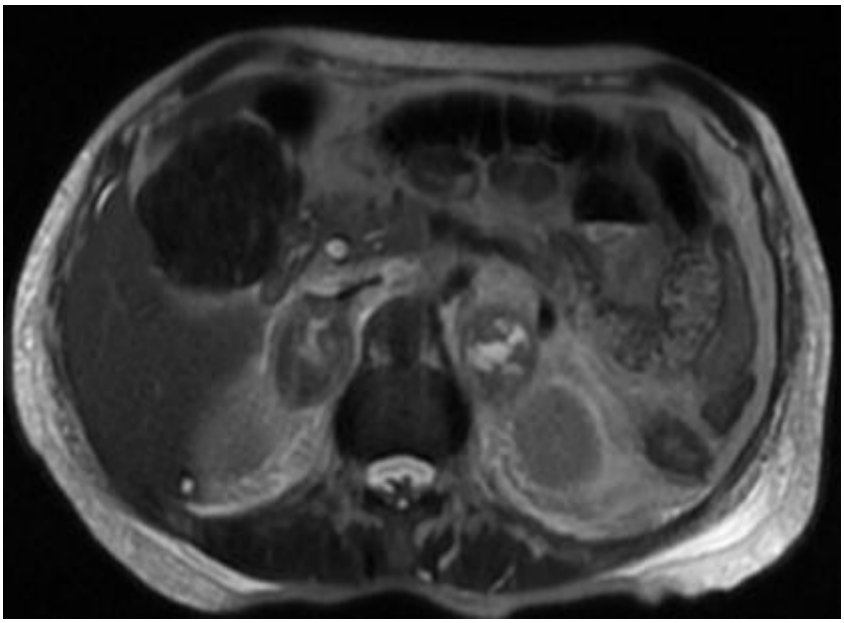
Description: Portal venous phase axial (a) and coronal (b) CT imaging of the abdomen showing newly enlarged bilateral adrenal glands with heterogenous attenuation on day 14 of admission **Origin:** Department of Radiology, Beacon Hospital, Dublin, Ireland 2022

b

Description: Portal venous phase axial (a) and coronal (b) CT imaging of the abdomen showing newly enlarged bilateral adrenal glands with heterogenous attenuation on day 14 of admission**Origin:** Department of Radiology, Beacon Hospital, Dublin, Ireland 2022

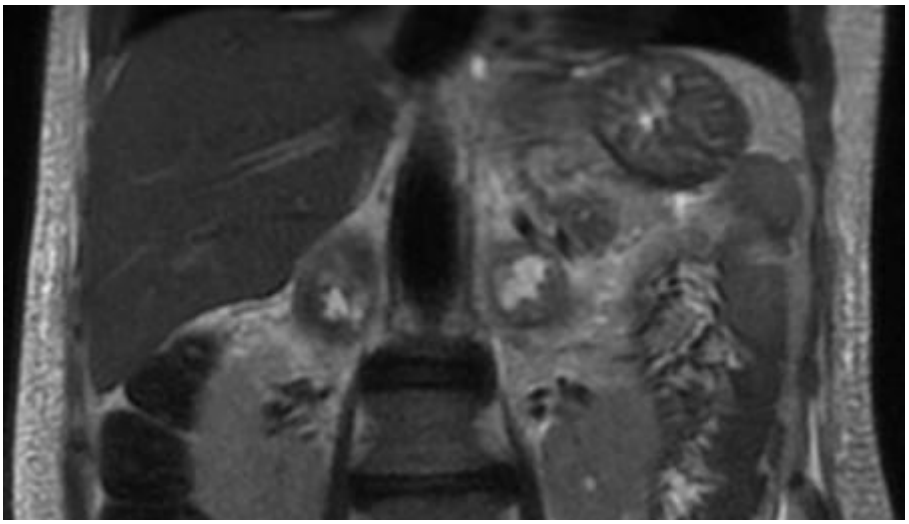
Figure 3

a



Description: Axial (a) and coronal (b) T2W MRIs on day 15 showing internal cystic areas within the enlarged adrenal glands **Origin:** Department of Radiology, Beacon Hospital, Dublin, Ireland 2022

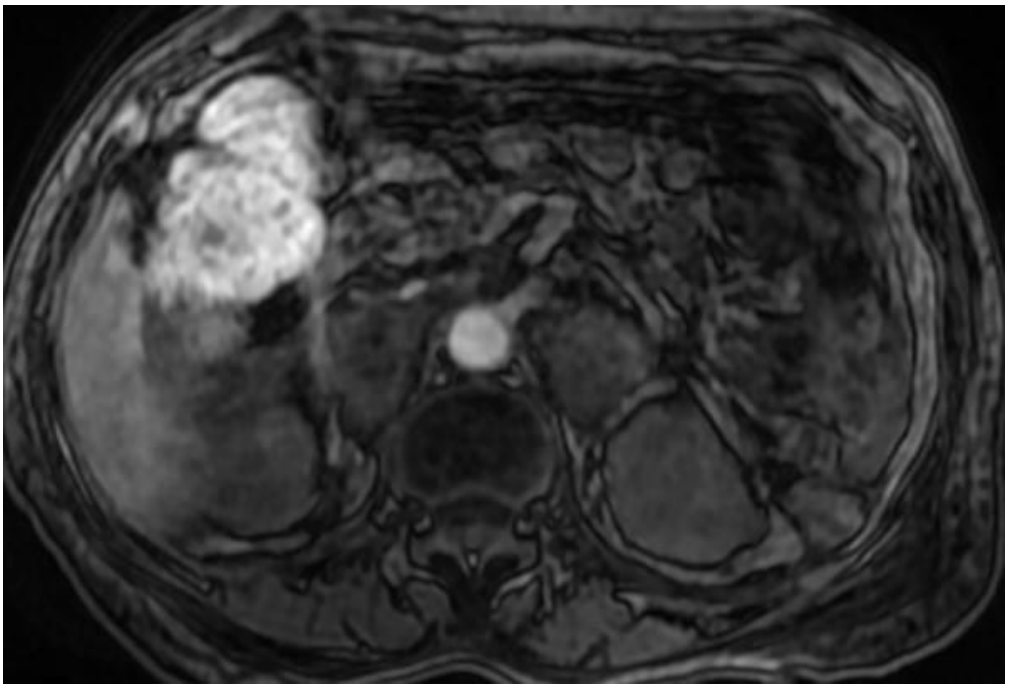
b



Description: Axial (a) and coronal (b) T2W MRIs on day 15 showing internal cystic areas within the enlarged adrenal glands **Origin:** Department of Radiology, Beacon Hospital, Dublin, Ireland 2022

Figure 4

a



Description: Arterial phase post contrast MRI axial spoiled gradient- recalled echo sequence showing the absence of adrenal gland enhancement on day 15 **Origin:** Department of Radiology, Beacon Hospital, Dublin, Ireland 2022