Persistent retroperitoneal haematoma from undiagnosed renal cell carcinoma in a young trauma patient

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SUMMARY

A man in his 20s presents to the emergency department after a water skiing accident and was diagnosed with a grade 3 left renal laceration. He subsequently required cystoscopic insertion of a ureteric stent after failing a trial of conservative management. Over the next 9 months, he re-presented to the hospital twice with increasing flank pain and fevers. Subsequent imaging demonstrated interval progression of the retroperitoneal haematoma with a suspicious calcified lower pole lesion which was biopsied subsequently and revealed malignant tissue. External compression of the kidney by this large haematoma was also thought to be contributing to a state of Page kidney. The patient underwent definitive management with an open left-sided radical nephrectomy which confirmed type 2 papillary renal cell carcinoma. The patient is now normotensive and back to his baseline function. He will undergo surveillance CT imaging and be referred to familial genetic services.

BACKGROUND

Renal cell carcinomas (RCC) are most commonly an incidental finding due to the improved imaging techniques over the last three decades[1] and the incidence in young adults is rare; less than 2 per 100 000 between the ages of 5 and 25.[2] In Australia, there were only 13 diagnoses of RCC in this age group in 2017.[3] In the setting of trauma, a persistent perinephric haematoma may be the first, although rare, warning sign of an underlying malignancy. Here, we describe the presentation of a man in his 20s with a persistent perinephric haematoma after initial trauma, with an eventual diagnosis of a type 2 papillary RCC. This rare diagnosis was disguised by the patient's traumatic presentation and led to a delayed diagnosis of a more sinister pathology. Although well-recognised guidelines for renal trauma were instituted, it was fortunate that readmission prompted further investigation into the aetiology of this patient's persistent retroperitoneal haematoma.

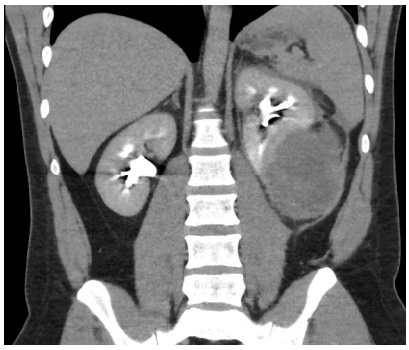

Figure 1 Coronal view of a delayed phase CT showing a large perirenal haematoma without obvious evidence of urinoma.

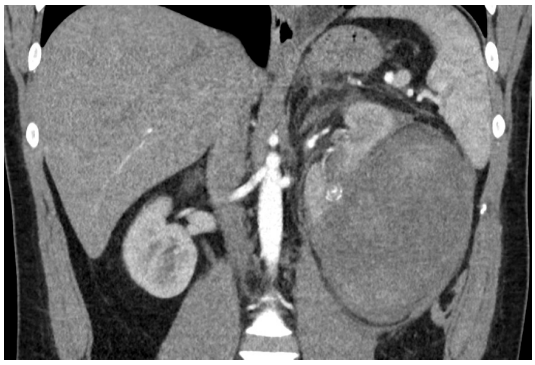

Figure 2 Coronal view of an arterial phase CT showing a large perirenal haematoma compressing the renal parenchyma and associated lower pole calcified lesion.

CASE PRESENTATION

A male patient in his 20s is transferred to a tertiary major trauma centre after a water skiing accident and complains of left flank pain and visible haematuria. The patient was promptly diagnosed with multiple undisplaced left-sided rib fractures and a grade 3 left renal laceration. A 1 cm calcified lower pole lesion is also noted on CT scan however thought to be of little significance. Initially, this patient was managed conservatively with bed rest, regular blood tests for haemoglobin and renal function as well as regular physical examination. Unfortunately, worsening flank pain, haematuria, declining haemoglobin and persistent fevers despite intravenous tazobactam and piperacillin ensued. Infected urinoma was a consideration even though a definitive contrast leak on urographic phase was not seen. The patient therefore underwent cystoscopic insertion of a ureteric stent. The patient was discharged after a 7-day admission with urology follow-up for ureteric stent removal in 4 weeks. At this follow-up, the patient was asymptomatic, and the ureteric stent was removed. An interval scan was requested at the 6–8-week mark to ensure reduction or resolution of the haematoma; however, the patient did not attend this appointment.

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Four months later, the patient presented to emergency after a fall onto his left side. He developed acute left flank pain associated with fevers. A repeat CT scan with arterial phase showed unchanged appearance of the perinephric haematoma and lower pole calcified lesion, again without evidence of active arterial bleed. Additionally, our radiology colleagues reported compression of the lower pole of the renal parenchyma by the haematoma. After failing to improve on intravenous antibiotics, a percutaneous drainage of the haematoma was attempted; however, due to the organised nature of this haematoma, minimal fluid was aspirated. The patient was discharged to home once again with a follow-up CT scan arranged to assess interval resolution of the haematoma in 6–8 weeks. This scan showed only a minimal reduction in the size of the haematoma.

Three months later, the patient returns to the emergency department with fevers and worsening left-sided flank pain. Repeat imaging showed an interval increase in size of the haematoma with significant external compression of the left kidney. A gadolinium-enhanced MRI followed by ultrasound-guided culture and core biopsy of the lower pole lesion was performed and revealed tissue that was highly suspicious for renal malignancy. The patient was counselled and consented for an open left radical nephrectomy which confirmed type 2 papillary RCC.

INVESTIGATIONS

Initial blood results on the first admission were unremarkable. A CT abdomen and pelvis with a delayed pyelogram phase was performed to assess the suspected renal trauma. Using the American Association for the Surgery of Trauma (AAST) Organ Injury Scale,[4] the CT revealed a grade 3 left-sided renal laceration (figure 1). An incidental finding of a lower pole 10 mm calcified lesion was noted; however, it was thought to be a calcified renal cyst of limited clinical significance. In the context of persistent fevers, a C reactive protein (CRP) rise to 286 led to an ultrasound aspiration of the haematoma with no growth. CRP was down-trending prior to discharge.

Subsequent admission 4 months later revealed unchanged appearance of the lower pole lesion on CT scan and perinephric haematoma (figure 2). Indicated by fevers despite broad-spectrum antibiotics, a percutaneous aspirate was performed with limited success. The patient was discharged with oral antibiotics.

On the patient's penultimate admission, 8 months after the initial injury, a repeat contrast CT scan showed an interval increase in the retroperitoneal haematoma and lower pole lesion. These investigations were discussed at our radiology/urology multidisciplinary meeting with the consensus for further evaluation with gadolinium-enhanced MRI to further characterise the lesion (figures 3 and 4). The result was non-specific; however, they favoured an enlarging haematoma. An ultrasound-guided aspirate and three core biopsies of solid material immediately followed the MRI. This biopsy material returned as necrotic material with ghosted outlines of epithelioid cells arranged in clusters and sheets with apparent stromal septae. Immunohistochemistry for cytokeratin AE1/3 highlighted these cells. Anatomical pathology considered this finding highly suggestive of underlying necrotic neoplasm.

Post radical nephrectomy and histopathology, the lesion was confirmed papillary type 2 RCC (figures 5 and 6), 125×120×105 mm, with haemorrhagic infarction of 80% of the tumour (figure 7). It was a WHO/ISUP grade 3 lesion limited to the kidney without renal sinus fat invasion and staged pathologically T2b with no lymphadenopathy. Staging scans revealed no metastases.

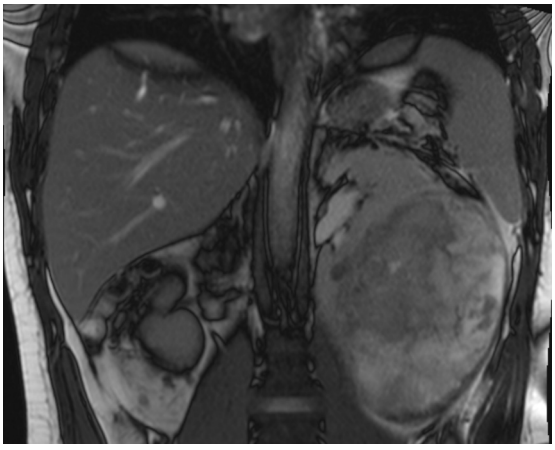

Figure 3 Coronal view of an MRI abdomen showing a large perirenal haematoma compressing the renal parenchyma.

TREATMENT

Treatment of renal laceration was managed according to the AAST guidelines. As per the international guidelines for management of renal trauma, grade 3 lacerations can attempt a trial of conservative management which includes strict bed rest for 48 hours with regular clinical examination and haemoglobin checks. As this patient developed worsening flank pain and a significant haemoglobin drop during his trial of conservative management, the decision was made for the cystoscopic insertion of a ureteric stent under general anaesthetic. The patient's pain significantly improved post-operatively and his haemoglobin remained stable. He was discharged with oral analgesia and ureteric stent removed 4 weeks later under local anaesthetic without complication.

On subsequent presentation 4 months later, post fall, a repeat full blood count, renal function and CT abdomen was performed. As the patient remained hemodynamically and biochemically stable with unchanged appearance of the haematoma on CT abdomen, ongoing conservative management was employed, with the addition of oral amoxicillin and clavulanic acid for new fevers. He was discharged with

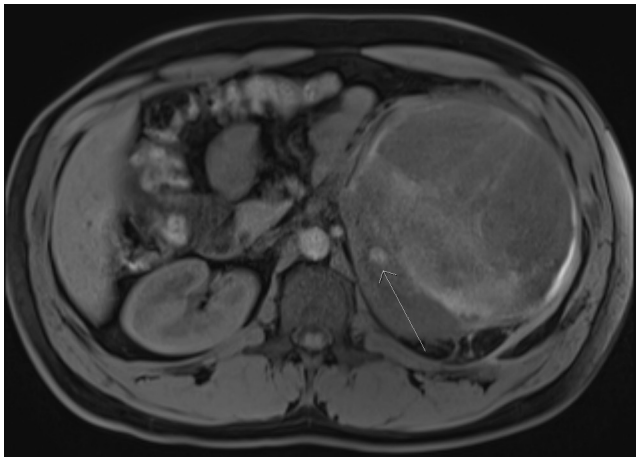

Figure 4 Axial view of an MRI abdomen with an arrow pointing the calcified lesion of interest in the lower pole of the right kidney.

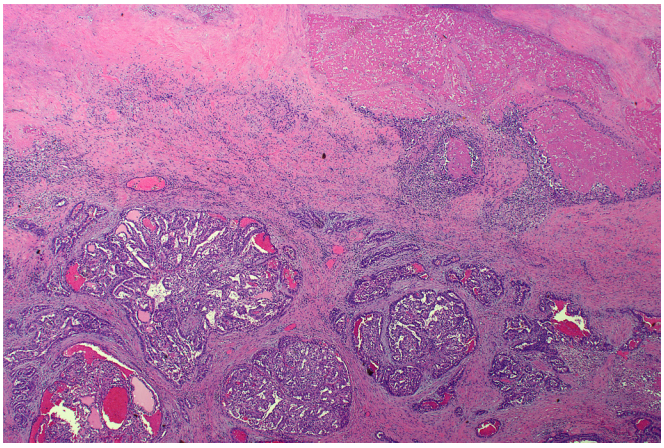

Figure 5 Histological analysis at 20× magnification showing type 2 papillary RCC. RCC, renal cell carcinoma.

ongoing analgesia and oral antibiotics with a plan for repeat imaging in 3 months to assess for resolution of the haematoma and further surveillance of the lower pole lesion.

The patient's final unplanned admission was due to an atraumatic increase in left flank pain associated with fevers. As there was further concern for an infected retroperitoneal haematoma, the patient was commenced on intravenous piperacillin and tazobactam. The increase in size of the retroperitoneal haematoma, in parallel with an increase in the lower pole lesion, prompted urgent clarification with gadolinium-enhanced MRI abdomen and ultrasound-guided aspirate for culture and renal biopsy. After histopathology increasing the suspicion for malignancy, the patient represented for an urgent elective open left-sided nephrectomy.

OUTCOME AND FOLLOW-UP

There were no intraoperative or immediate postoperative complications related to the open radical nephrectomy. The patient recovered on the ward and stayed for a total of 4 days. His renal function remained at baseline with an estimated Glomerular Filtration Rate(eGFR)>90.

Fortunately, the type 2 papillary RCC was limited to the kidney without no renal sinus fat invasion identified and clear of margins. With these results, he was discussed at our urology-oncology-radiology multidisciplinary team with the consensus for a 3-month CT surveillance scan and referral to familial genetic services.

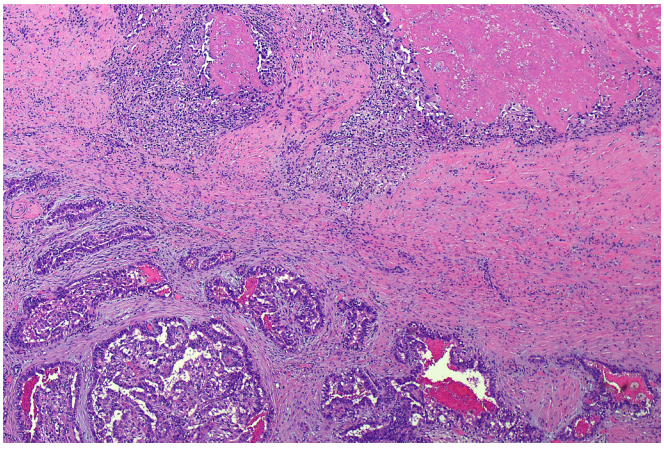

Figure 6 Histological analysis at 100× magnification showing type 2 papillary RCC. RCC, renal cell carcinoma.

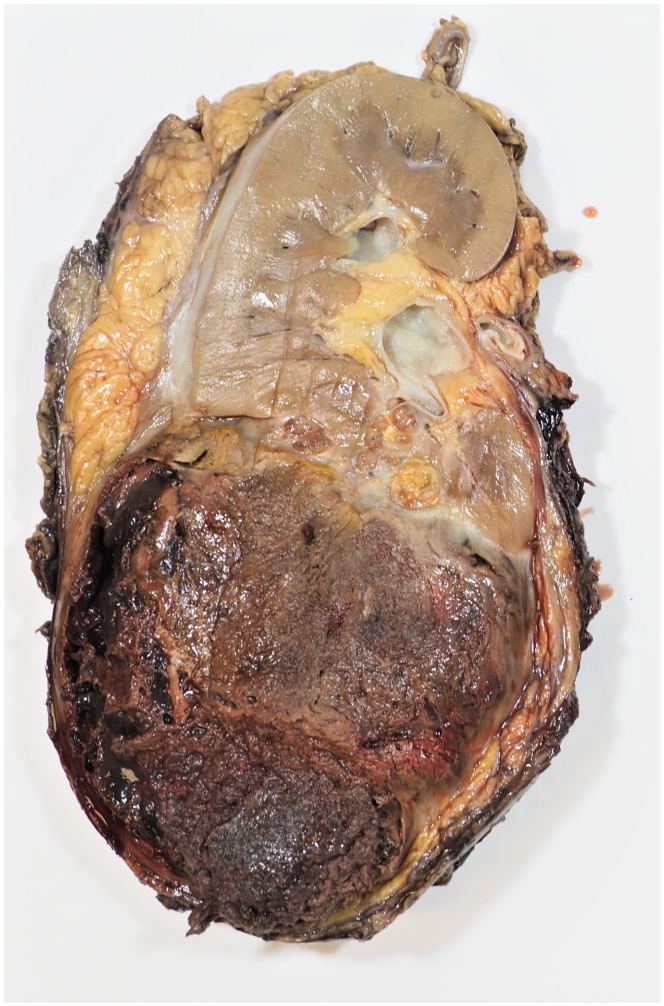

Figure 7 Left radical nephrectomy macroscopic specimen showing a large and necrotic/haemorrhagic lower pole tumour.

DISCUSSION

The incidence of renal injury in all trauma is approximately 5% and is most often caused by blunt impact to the abdomen in young adult males.[5] Persistence and progression of the haematoma may be explained by infection, reinjury or bleeding diathesis. After excluding these factors, this case highlights the consideration of unlikely alternatives. Although rare, an underlying pathology, such as a RCC, predisposes to a traumatic perinephric haematoma.[6]

As an individual pathology, low mechanism trauma with renal injury leading to diagnosis of underlying malignancy is documented.[7] Renal cancer in those under 40 years old is rare, most commonly diagnosed in those between 65 and 74 years of age, median age at diagnosis 64.[8] RCC is a primary neoplasm deriving from the renal cortex. Clear cell RCC accounts for 70%–85% of RCC and papillary RCC second most common between 10% and 15%.[9] In 2017, only 1.8% (n=31) of renal cancer diagnoses in Australia were in those aged between 5 and 30.[3] The earlier the diagnosis, the higher risk of metachronous RCC due to higher chance of genetic disturbance rather than sporadic mutation leading to malignancy.[9]

Incidental diagnosis of renal malignancy following trauma has been previously described. Abib *et al*[7] described multiple cases in the paediatric population of low mechanism trauma with underlying malignancy, emphasising the incidence of Wilm's Tumours almost exclusively occurring in children. Hiraki *et al* presented an adult with massive haemorrhage found incidentally which was subsequently diagnosed as papillary RCC.[10] This case represents the delayed diagnosis of a rare and sinister pathology in a young patient following an innocuous trauma and serves as an important reminder to consider alternate diagnoses when a patient's recovery deviates from the expected trajectory.

Learning points

- Renal trauma occurs predominantly in young men and the majority are treated conservatively.
- A graded approach to follow-up imaging reduces unnecessary radiation exposure.
- When mechanism, diagnoses and natural history are incongruent, it is wise to consider rare pathology.
- Preoperative discussion at multidisciplinary team and stepwise diagnosis is essential for complex surgical planning in young patients.

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Case reports provide a valuable learning resource for the scientific community and can indicate areas of interest for future research. They should not be used in isolation to guide treatment choices or public health policy.

REFERENCES

1 Ferlay J, Colombet M, Soerjomataram I, *et al*. Cancer incidence and mortality patterns in Europe: estimates for 40 countries and 25 major cancers in 2018. *Eur J Cancer* 2018;103:356–87.
2 SEER*Explorer Application [Internet]. [cited 2021 Nov 24]. Available: https://seer.cancer.gov/explorer/application.html?site=72&data_type=1&graph_type=3&compareBy=subtype&chk_subtype_630=630&hdn_rate_type=1&sex=1&race=1&advopt_precision=1&advopt_show_ci=on&advopt_display=2
3 Cancer data in Australia, About [Internet]. Australian Institute of Health and Welfare. [cited 2021 Nov 24]. Available: https://www.aihw.gov.au/reports/cancer/cancer-data-in-australia/contents/about
4 Kozar RA, Crandall M, Shanmuganathan K, *et al*. Organ injury scaling 2018 update: spleen, liver, and kidney. *J Trauma Acute Care Surg* 2018;85:1119–22.
5 Singh S, Sookraj K. Kidney Trauma. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 [cited 2021 Nov 24]. Available: http://www.ncbi.nlm.nih.gov/books/NBK532896/
6 Schmidlin FR, Iselin CE, Naimi A, *et al*. The higher injury risk of abnormal kidneys in blunt renal trauma. *Scand J Urol Nephrol* 1998;32:388–92.
7 Abib SdeCV, Leite MTC, Ribeiro RC, *et al*. Renal tumor and trauma: a pitfall for conversative management. *Int. braz j urol.* 2011;37:514–8.
8 Kidney and Renal Pelvis Cancer — Cancer Stat Facts [Internet]. [cited 2021 Nov 24]. Available: https://seer.cancer.gov/statfacts/html/kidrp.html
9 Epidemiology, pathology, and pathogenesis of renal cell carcinoma - UpToDate [Internet]. [cited 2021 Nov 24]. Available: https://www.uptodate.com/contents/epidemiology-pathology-and-pathogenesis-of-renal-cell-carcinoma?search=renal%20cell%20carcinoma&source=search_result&selectedTitle=3~150&usage_type=default&display_rank=3#H16
10 Hiraki Y, Okamoto D, Nishie A, *et al*. Papillary renal cell carcinoma with massive hematoma mimicking hemangioma. *Radiol Case Rep* 2019;14:1003–6.