CASE REPORT

Periadrenal inflammatory myofibroblastic tumour: half a decade before cure

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SUMMARY

A 30-year-old ex-smoker with a background history of childhood asthma presented with worsening shortness of breath despite receiving high doses of oral corticosteroid for pemphigus vulgaris which was diagnosed 5 years earlier. A high-resolution CT examination of the thorax reported non-specific bronchiectatic changes and revealed an incidental suprarenal mass. A subsequent CT scan confirmed a large adrenal mass with areas of necrosis and calcification. Serum renin and aldosterone, urinary catecholamine and 5-hydroxyindoleacetic acid were within normal limits. Surgical intervention was delayed due to difficulty in optimising preoperative respiratory functions. He finally underwent a midline laparotomy for removal of the tumour. Histopathological examinations revealed extrapulmonary inflammatory myofibroblastic tumour arising from the periadrenal soft-tissue, with presence of normal adrenal gland. He showed immediate improvements of his asthmatic symptoms and pemphigus vulgaris following the surgery. His oral steroid was rapidly reduced and he achieved complete remission 2 months later.

BACKGROUND

This case describes a periadrenal inflammatory myofibroblastic tumour (IMT) presenting as a large suprarenal mass, which demonstrated complete resolution of his respiratory and skin manifestations after the excision of the tumour.

CASE PRESENTATION

A 30-year-old man with underlying childhood bronchial asthma presented with progressively worsening shortness of breath over the past 3 years. This was associated with non-productive chronic cough, with no fever nor any other constitutional symptoms. He had been diagnosed with pemphigus vulgaris 5 years earlier, during which he presented with painful oral ulcers and generalised skin lesions. He had been in remission since then with oral prednisolone of between 15 and 20 mg daily. His symptoms continued to worsen despite high doses of inhaled long-acting beta-agonist and corticosteroids, oral montelukast, in addition to the systemic steroids. This had resulted in multiple hospital admissions for exacerbations of bronchial asthma, fortunately sparing assisted ventilation or intensive care unit admissions. Multiple attempts at reducing the oral steroid dose resulted in relapses of his pemphigus vulgaris mainly manifested by

painful oral ulcers. Other than that, he has had no previous surgery and there was no significant family history. He was an ex-smoker from 4 years ago with a 20 pack-year history of cigarette smoking.

INVESTIGATIONS

His lung spirometry revealed severe obstructive pattern with forced expiratory volume 1 s of 0.73 (20% predicted), forced vital capacity of 2.7 (64% predicted) and a ratio of 27%. Due to his worsening asthmatic symptoms, he underwent a high-resolution CT of the thorax, which showed areas of non-specific bronchiectasis in the lungs. However, it revealed an incidental finding of a large left suprarenal mass.

For further delineation of the mass, a contrast-enhanced CT of the abdomen was performed. This examination demonstrated a heterogeneously enhancing mass in the left suprarenal region, measuring 10.6×8.8×8.5 cm (AP × ED × CC), with presence of central hypodensities and internal calcifications (figure 1). The mass displaced the pancreas anteriorly and the left kidney inferiorly. The left adrenal was not visualised, and the right adrenal was normal. There was no hydronephrosis, and the rest of the intra-abdominal findings were unremarkable. There were no suspicious osseous lesions.

DIFFERENTIAL DIAGNOSIS

In view of the size, the site and the absent left adrenal gland, the provisional diagnoses of an adrenocortical carcinoma, pheochromocytoma and various inflammatory-related mass lesion were entertained. Further biochemical investigations subsequently revealed normal levels of 24-hour urine catecholamines, dehydroepiandrosterone sulfate, plasma renin activity and serum aldosterone. The cortisol axis was not assessed as he was on long-term prednisolone and tuberculosis adrenal was later ruled out. In view of the worsening respiratory symptoms, the possibility of a carcinoid tumour was also considered, however, the 24-hour urinary 5-hydroxyindoleacetic acid level was normal as well.

TREATMENT

A laparoscopic removal of the adrenal tumour was planned, which was subsequently postponed twice in view of the high-surgical risk attributed by his poorly controlled asthma despite being on

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Figure 1 Selected axial (A) and coronal (B) contrast-enhanced abdominal CT images demonstrating a large heterogeneously enhancing left suprarenal mass (asterisks) associated with central hypodense area and internal coarse calcifications. It displaces the tail of the pancreas anteriorly and the left kidney inferiorly.

maximum medical therapy. He received two doses of intravenous adalimumab, which improved his respiratory symptoms and deemed him fit for surgery. He underwent a left adrenalectomy with complete removal of the tumour, with no blood pressure fluctuations or respiratory compromise both intraoperatively and postoperatively. Unfortunately, his surgical procedure was complicated by dissection of the left renal artery which subsequently resulted in a left nephrectomy. Fortunately, the patient recovered fully and was discharged after 2 weeks of hospital stay. He remained well without any medications and continued to be monitored.

PATHOLOGICAL FINDINGS

Interestingly, histopathological examination subsequently revealed the tumour to be discrete from an otherwise normal adrenal gland. Macroscopically the tumour is encapsulated, with firm, tan cut face and focal calcifications. Microscopically the tumour is composed of predominantly inflammatory cell component in a densely fibrotic stroma and focal plump spindle cell proliferation (figure 2). There is no cytological atypia and mitoses are inconspicuous. The inflammatory cells comprise mainly of a mixture of CD3-positive T-lymphocytes and CD20-positive B-lymphocytes along with polyclonal plasma cells, the latter highlighted by CD138 immunohistochemistry with 2:1 kappa:lambda ratio. The mesenchymal/spindle cell component shows diffuse, strong positive staining with smooth

Figure 2 The predominant inflammatory cell component is composed of lymphocytes and plasma cells and there is no atypia of the spindle cells (H&E, x40).

Figure 3 Faint granular cytoplasmic positivity is seen. While focal, the staining is localised to the cytoplasm of the spindle cells only (ALK-1, x40).

muscle actin (SMA), focal positivity for broad-spectrum cytokeratin (CK AE) and only focal faint staining for anaplastic lymphoma kinase-1 (ALK-1) (figure 3). The lesional cells are negative for epithelial membrane antigen, desmin, S100 and CD34. The morphology and immunohistochemical profile are consistent with the diagnosis of extrapulmonary IMT arising from the periadrenal soft-tissues.

OUTCOME AND FOLLOW-UP

Following the surgical removal of the tumour, he demonstrated an almost immediate relief of his asthmatic symptoms and the pemphigus vulgaris. The prednisolone was gradually reduced and ceased a mere 2 months after the surgery without any recurrence of his pemphigus nor worsening of his asthmatic symptoms.

DISCUSSION

IMT or inflammatory pseudotumour was a term recognised in the early 1950s to describe a group of benign tumours, which had the clinical and radiological features of malignancy.¹ The exact underlying aetiology is currently ambiguous, but characteristic appearances include spindle cell proliferation with distinctive fibroinflammatory and pseudosarcomatous appearance.² IMTs are unusual solid tumours commonly detected in children and young adults.² It has been found to occur at almost any site in the body, the lungs being the most common organ involved. While extrapulmonary IMTs account for 5% of all IMTs, retroperitoneal IMTs are relatively rare.² This case report is unique by virtue of two main points: the site and the course of the disease. Recent reports have illustrated histologically confirmed adrenal IMTs, which were initially diagnosed as adrenal cell carcinoma.^{3 4} This case, however, demonstrated the presence of periadrenal IMT with normal left adrenal gland. Retroperitoneal IMT is rare,⁵ with only 12 cases reported in the English literature to date,⁶ mainly involving the pelvic, renal and pancreatic regions. This predilection towards visceral soft-tissues is seen mainly in children and adolescents, with a tendency for local recurrence, but low risk of distant metastasis.⁷

The diagnosis of IMTs is generally challenging as they are predominantly asymptomatic, while fever and weight loss had been reported in only less than 20% of cases.¹ Abdominal IMT could often present with compressive symptoms with or without obstruction or invasion of adjacent organs.⁸ This was not demonstrated in our patient despite the notably large tumour bulk, which was most likely due to its retroperitoneal origin. Furthermore, the interesting presentation was the severe and prolonged unrelated symptoms which were promptly alleviated on removal of the tumour. Delays in establishing the diagnosis of IMTs is further added by the absence of specific radiological features.⁶ CT and MRI could demonstrate homogeneous or heterogeneous lesions with variable density. Furthermore, contrast enhancements are non-specific and associated with varying amounts of central necrosis or fibrosis.^{6,8}

The definitive diagnosis of IMT is almost always unsuspected, as in our patient. It is histologically characterised by myofibroblastic and fibroblastic spindle cell proliferation of variable cellularity, prominent inflammatory infiltrates comprised predominantly of plasma cells and lymphocytes, in either myxoid or hyalinised stroma. IMT lesions are typically positive for vimentin, SMA and muscle-specific actin. Approximately half of the cases are positive for ALK; desmin and CK positivity are also sometimes observed.^{6,7} One of the two plausible explanations towards the underlying disease process of IMTs is neoplasm. This is supported by the prevalent molecular features involving ALK gene rearrangement, which has been reported in approximately 50% of IMTs, both pulmonary and extrapulmonary.⁷ This represents a reasonable justification and sets it distinct from other 'inflammatory pseudotumours'.⁷ However, confirmatory break-apart ALK-1 fluorescence in situ hybridisation was not available to support the underlying diagnosis. Furthermore, serum IgG4 measurements would have been useful to exclude IgG4-related inflammatory lesion, which was highly suggestive due to steroid-responsive nature of the tumour. Unfortunately, this test too was not available within our facility.

The other possible underlying cause for IMTs is inflammation as inflammatory mediators such as cytokines and interleukin-1 have been consistently reported in this rare condition. The inflammatory mediators result following an insult leading to a cascade of fibroblasts proliferation, weakened endothelium and extravasation of polymorphous cellular infiltrate into the extracellular spaces.^{9,10} Various trigger factors have been reported including infections, smoking, trauma and post-adenoidectomy; however, ambiguity in the definite aetiology remains.⁹ In our patient, inflammation seemed to be a more plausible explanation as the patient had the history of smoking and the more recent pemphigus vulgaris. Although this may require further confirmatory tests, we could only postulate that the almost immediate resolution of his refractory asthmatic attacks and moderately severe pemphigus vulgaris further supported the possibility of ongoing inflammatory process as the underlying cause.

The treatment of choice for IMTs is complete surgical resection, whenever feasible.⁹ Ill-circumscribed tumours, particularly in the abdominopelvic area may be a challenge. Local recurrences are not uncommon, often requiring re-excision if possible and most remained disease free with long-term follow-ups.^{11,12} Unresectable tumours have been reported to be responsive towards corticosteroid monotherapy, resulting in rapid resolution and sustained remission.^{11,13,14} Non-steroidal anti-inflammatory agents (NSAIDs) have also been

demonstrated to be efficacious.^{11,15} In a review of eight studies of IMTs, a total of 10 patients were managed successfully with NSAID monotherapy, with tumours mainly located at the lung and liver.¹¹ The success with these treatments further emphasised the inflammatory nature of this condition. Although most of the IMTs behave in benign fashion, a few cases of malignant behaviour have been reported. Therefore, no further treatment but a close clinical follow-up was recommended in this case.

In summary, this report described a patient who suffered a protracted course of both respiratory and dermatological conditions over a considerable amount of time, without any abdominal symptoms, while harbouring a relatively large suprarenal tumour. The description of this case is unique in the location of the tumour arising from the perirenal tissue and also in the presentation of his symptoms which was highly suggestive of ongoing inflammation followed by an almost immediate cure on removal of the tumour.

This case highlights the importance of recognising uncommon causes of a suprarenal mass. Early identification and removal of an IMT can be associated with marked improvement of other underlying inflammatory conditions, namely exacerbation in bronchial asthma and pemphigus vulgaris as demonstrated in this case.

Learning points

- Recognising IMT as a differential diagnosis of a suprarenal mass, particularly in association with other inflammatory conditions.
- Early identification and treatment.
- Removal of mass resulted in complete remission of other underlying conditions.

Contributors The authors have provided substantial contributions to the conception or design of this work. RAG and FZMS planned, obtained relevant information and drafted the clinical case write up. MH elaborated on the radiological input including discussion on the role of imaging in the diagnosis. MAA provided the histopathology report and provided the required discussions. All authors revised, criticised and approved the final content. All authors agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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REFERENCES

- 1 Johri G, Chand G, Mishra SK, *et al.* Rare case of inflammatory myofibroblastic tumor of the adrenal mimicking adrenocortical carcinoma. *Clin Surg* 2017;2:1524.
- 2 Coffin CM, Watterson J, Priest JR, *et al.* Extrapulmonary inflammatory myofibroblastic tumor (inflammatory pseudotumor). A clinicopathologic and immunohistochemical study of 84 cases. *Am J Surg Pathol* 1995;19:859–72.
- 3 Umiker WO, Iverson L. Postinflammatory tumors of the lung; report of four cases simulating xanthoma, fibroma, or plasma cell tumor. *J Thorac Surg* 1954;28:55–63.
- 4 Chawla A, Hameed Z, Mishra D, *et al.* Adrenal inflammatory myofibroblastic tumour. *BMJ Case Rep* 2013;2013:bcr2013010122.
- 5 Al Sannaa G, Wimmer JL, Ayala AG, *et al.* An isolated inflammatory myofibroblastic tumor of adrenal gland. *Ann Diagn Pathol* 2016;25:33–6.
- 6 Wang X, Zhao X, Chin J, *et al.* Recurrent retroperitoneal inflammatory myofibroblastic tumor: a case report. *Oncol Lett* 2016;12:1535–8.
- 7 Gleason BC, Hornick JL. Inflammatory myofibroblastic tumours: where are we now? *J Clin Pathol* 2008;61:428–37.
- 8 Aptel S, Gervaise A, Fairise A, *et al.* Abdominal inflammatory myofibroblastic tumour. *Diagn Interv Imaging* 2012;93:410–2.

- 9 Palaskar S, Koshti S, Maralingannavar M, *et al.* Inflammatory myofibroblastic tumor. *Contemp Clin Dent* 2011;2:274–7.
- 10 Oh JH, Yim JH, Yoon BW, *et al.* Inflammatory pseudotumor in the mandible. *J Craniofac Surg* 2008;19:1552–3.
- 11 Chavez C, Hoffman MA. Complete remission of ALK-negative plasma cell granuloma (inflammatory myofibroblastic tumor) of the lung induced by celecoxib: a case report and review of the literature. *Oncol Lett* 2013;5:1672–6.
- 12 Kovach SJ, Fischer AC, Katzman PJ, *et al.* Inflammatory myofibroblastic tumors. *J Surg Oncol* 2006;94:385–91.
- 13 Lee MH, Lee HB, Lee YC, *et al.* Bilateral multiple inflammatory myofibroblastic tumors of the lung successfully treated with corticosteroids. *Lung* 2011;189:433–5.
- 14 Carswell C, Chataway J. The successful long-term management of an intracranial inflammatory myofibroblastic tumor with corticosteroids. *Clin Neurol Neurosurg* 2012;114:77–9.
- 15 Hakozaiki Y, Katou M, Nakagawa K, *et al.* Improvement of inflammatory pseudotumor of the liver after nonsteroidal anti-inflammatory agent therapy. *Am J Gastroenterol* 1993;88:1121–2.

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