CASE REPORT

Metastatic prostate adenocarcinoma presenting as a large right supraclavicular and anterior chest wall mass

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SUMMARY

Left-sided cervical lymphadenopathy as first presentation of metastatic prostate carcinoma is not a novel observation. Here, we discuss a case of metastatic prostate primary carcinoma with an initial presentation of a right supraclavicular mass with extension into the anterior chest wall, which on radiological investigation was suggestive of a sarcomatous tumour; however, was confirmed to be pervasive metastatic prostatic adenocarcinoma. This is the second case in literature, which reports a prostatic primary cancer presenting as a right-sided supraclavicular and anterior chest wall mass.

BACKGROUND

Prostate carcinoma is the second most commonly diagnosed malignancies in men, and has a worldwide incidence of up to 300 per 100 000.¹ Metastatic disease at presentation occurs in up to 60% of patients, and common sites include the bone, lymph nodes, lung and bladder.² Initial presentation of supraclavicular lymphadenopathy is rare, with a reported incidence of 0.28%.^{3–7} One postulate to the pathophysiology of supraclavicular metastases is haematogenous spread via the Batson's plexus of the vertebral venous system, by direct extension from the primary prostatic cancer site. The propensity of prostate carcinoma to metastasise specifically to the left cervical region is itself not a novel observation. The pathogenesis of which is that of micro-metastases to the obturator–hypogastric, presacral, iliac and para-aortic lymph nodal chains to the cisterna chyli, with eventual access to the thoracic duct and left-sided cervical chain.⁸ Right-sided cervical metastasis are more rare, and is more likely to occur in the presence of extensive intra-abdominal and trans-diaphragmatic disease, as spread is possible via the right bronchomediastinal trunk.⁸ There are few cases of metastatic prostate carcinoma with initial presentation of right-sided cervical lymphadenopathy in the literature.⁹ Here, we present a case of metastatic prostate adenocarcinoma presenting with a large right supraclavicular mass with extension into the right upper chest wall, which is a unique presentation of metastatic prostate adenocarcinoma.

CASE PRESENTATION

A Chinese man aged 84 years was referred to the surgical oncology department for a large right anterior chest wall mass. The patient reported a 6-month history of a non-tender swelling over the

right anterior chest. There was an associated paresthesia of the ulnar aspect of the ipsilateral hand, but he denied any pain, fever, respiratory symptoms, lower urinary tract symptoms or changes in bowel habits. Constitutionally, he reported some loss of appetite and unquantified loss of weight. There was no significant past medical or family history of cancers. He had 30 pack year history of smoking. Physical examination revealed a large 12×12 cm, irregular and firm right supraclavicular mass. On inspection, the mass extended into the right chest wall, over the anterior first to third rib. The mass was dull to percussion, and auscultation of the chest did not reveal any wheeze or crepitations. There was no associated axillary or inguinal lymphadenopathy. Abdominal examination was unremarkable, and digital rectal examination was not performed at the time of initial assessment.

Figure 1 MRI coronal section showing supraclavicular mass with mediastinal. Axial CT imaging at the level of the manubrium showing extensive involvement of the overlying second rib with soft tissue extension and pulmonary compression.

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INVESTIGATIONS

An MRI scan of the thorax was performed which showed an extensive, dominant right supraclavicular mass measuring 15×10×12 cm, extending to the right upper chest wall. Intrathoracically, the mass involved the first two right ribs, and encased the right subclavian artery with likely involvement of the brachial plexus. Additionally, there were multiple lesions in the thoracic vertebrae from T4 to T10 suggestive of diffuse metastatic disease (figures 1 and 2). The clinical and radiological suspicion was that of an aggressive sarcomatous tumour.

Following the MRI, a core biopsy of the mass was performed by the bedside under local anaesthetic, and showed moderately differentiated adenocarcinoma with tumour cells staining positive for prostate-specific antigen (PSA), α -methyl-lacyl-CoA race-mase and equivocally for prostate-specific acid phosphatase (figure 3). Serum PSA was tested and was >5000 µg/L (normal <4 µg/L).

A subsequent CT scan of the thorax, abdomen and pelvis was performed to evaluate the extent of disease, which revealed a heterogeneous 7×7 cm mass in the prostatic bed with invasion into posterior wall of the urinary bladder, extensive bilateral pulmonary and vertebral metastatic disease, and delineated the right supraclavicular mass invading into the right thoracic inlet with engulfment of the right subclavian artery and superior vena cava with tumour thrombus in situ (figures 2 and 4).

TREATMENT

The patient was referred to the medical oncology team, and hormonal treatment was initiated as an outpatient, with bicalutamide and, subsequently, leuporelin C. The patient had declined radiation therapy due to fear of side effects affecting quality of life. After 8 weeks, the patient's serum PSA decreased to undetectable levels.

OUTCOME AND FOLLOW-UP

A follow-up CT scan after 9 months of androgen deprivation therapy has shown that while the prostatic mass is still adherent to the posterior bladder wall, it had decreased in size from 8 to 4.7 cm and that the dominant right anterior chest wall mass has almost completely resolved. There was interval resolution of bilateral pulmonary metastatic deposits. Additionally, the paravertebral soft tissue thickenings at T4–T11 have resolved with sclerosis compatible with flare response secondary to treatment (figure 5).

Clinically, the patient's right anterior chest wall mass and right cervical lymphadenopathy was completely absent on palpation (figure 6). The associated ulnar-based paraesthesia of the right upper extremity had completely resolved. He had no lower urinary tract symptoms and no development of urinary or

Figure 2 Axial section on CT through the level above clavicles show an enlarged right-sided mass.

Figure 3 (A) Core biopsy of the anterior chest wall and supraclavicular mass demonstrating adenocarcinoma (H&E stain, magnification ×100); (B) immunohistochemistry staining of neoplastic cells from the same site showing strong positivity for prostate-specific antigen (PSA) (PSA stain, magnification ×400); (C) positivity for PSAMA (magnification ×400) and (D) PSAP positivity (magnification ×400).

faecal incontinence. He remained stable on continued androgen deprivation therapy.

DISCUSSION

This case is unique as it is the second case in reported literature of undiagnosed advanced metastatic prostate carcinoma presenting with large right-sided chest wall and supraclavicular lymphadenopathy. Though cited as uncommon, left-sided lymphadenopathy as first presentation of disseminated prostate

Figure 4 Axial and coronal abdominal sections on CT pelvis show 7×7 cm heterogeneous mass in the prostatic bed.

Figure 5 Coronal and axial views show resolution of right anterior chest wall mass previously abutting and compression right upper lobe of the lung. Axial view shows significant reduction in the right supraclavicular mass.

carcinoma has been observed and reported in literature since the 1970s.¹⁰

More recently, there have been more reports of metastatic prostate cancer presenting as a left-sided supraclavicular mass in keeping with lymphogenous spread. Davarci *et al.*¹¹ have reported two cases of prostate metastatic primaries with presentation of left supraclavicular lymphadenopathy in 2012. Zhu *et al.*¹² documented a similar case study in 2013 where immunohistological staining of an initial left supraclavicular mass biopsy was negative for PSA, leading to a hunt for a primary tumour in the aerodigestive tract.¹³ Similarly, a Japanese group has also reported a case of metastatic prostate carcinoma in 2014 presenting as left-sided supraclavicular swelling, leading to a working diagnosis of malignant lymphoma. The patient had no symptom of any lower urinary tract symptoms and a possible prostate primary was not generated as a differential and serum PSA level was not investigated until a later time point.^{13–14} Interestingly, Matei and Bhushan¹⁵ have presented, in 2015, a singular case of metastatic prostate cancer presenting as a central chest wall mass eroding the sternum and abutting the pericardium as well as mediastinal fat.

In a retrospective survey, Jones and Anthony⁸ identified that among 250 cervical lymph node biopsies from 1982 to 1990,

Figure 6 The right-sided chest wall mass and concomitant lymphadenopathy resolved after 8 weeks on androgen blockade. Masses were not clinically palpable on follow-up at 6 months post-treatment.

69% (11 of 16) of patients who died of metastatic prostate carcinoma had a positive left cervical nodal metastasis confirmed with retrospective PSA and PASP stains of preserved biopsy specimens. The caveat of their study was that as a general survey of metastatic carcinoma was not originally intended in the study design, their data thus represented *minimum* figures and, as such, left-sided cervical lymphadenopathy as first presentation of metastatic prostatic carcinoma may well be overlooked and under-reported. This also may be the case for right-sided cervical lymphadenopathy as first presentation for metastatic primary prostate carcinoma. Likewise, Saitoh *et al.*² have reported 31% (429 of 1367) of prostate cancer at autopsy was metastatic to cervical nodes; though, whether these metastatic deposits represented microdisease or macrodisease is not specified.

To distinguish, right-sided lymph node macro-metastasis is exceedingly rare with only one other case report existing to the best of our knowledge.⁹ Specifically, this reported patient had significant osseous metastatic disease as well as prominent para-aortic lymphadenopathy along with a high-grade Gleasons 8 (4+4) adenocarcinoma with poor response to androgen deprivation therapy.

In our patient, there was absence of abdominal and para-aortic lymph node disease; though, there was advanced pulmonary metastatic disease in keeping with the postulate of haematogenous spread via Batson's plexus and ultimate access to the bronchomediastinal trunk versus that of the conventional lymphatic spread due to the prostates-rich lymphatic labyrinth. This lends strength to the postulate that haematogenous spread bypasses the para-aortic axial chain to the left thoracic duct pathway of lymphogenous metastasis.

From reported literature, the prognosis of metastatic prostate carcinoma to the head and neck is good with an average survival of 34.4 months with appropriate treatment.¹⁶ Though due to the rarity or, rather, the likely *under-reporting* of cervical metastasis from prostate cancer, further studies based on larger identified numbers will need to be performed to reflect true survival outcomes.

Further research may be carried out to compare response to treatment between those patients with left-sided versus right-sided cervical metastasis as previous reports have shown that right-sided cervical metastasis respond poorly androgen deprivation.⁹ Our patient, however, had a positive response to androgen deprivation therapy with resolution of his right supraclavicular and chest wall mass in addition to his spinal metastases which points to the known phenotypic heterogeneity of metastatic prostate disease in response to hormonal treatment.

In conclusion, it cannot be overly emphasised that in elderly male patients who present with right-sided neck masses and/or anterior chest wall masses, metastatic prostate carcinoma must remain a plausible differential as many cases reported in existing literature have shown that cervical lymphadenopathy and chest wall masses as first presentation have been successful red herrings guising underlying prostate cancer as culprit.

This may be in part due to the fact that metastatic disease may be clinically quiet if not silent depending on critical load of metastatic or primary tumour deposits. Thus, in elderly male patients who present with clinical right-sided lymphadenopathy, a thoroughly physical examination, including examination of prostatomegaly and a baseline serum PSA level, is absolutely crucial in initial work up as it may be revealing of an undiagnosed widespread prostatic primary carcinoma.

Learning points

- ▶ In male patients who present with asymptomatic neck or anterior chest wall masses, metastatic adenocarcinoma of the prostate should be a required differential diagnosis, especially in men older than 65 years of age.
- ▶ Cervical and supraclavicular lymphadenopathies and chest wall masses as initial presentation have been successful red herrings beguiling underlying metastatic prostate cancer.
- ▶ Though advanced metastatic prostate cancer are likely to cause obstructive lower urinary tract symptoms, it can also be clinically quiet or even silent depending on critical metastatic or primary tumour load.
- ▶ Distant metastasis in prostate cancer usually confers a poor prognosis; however, there are precedent case reports, which show that disseminated disease may be androgen deprivation responsive.

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