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CASE REPORT

Robot-assisted abdominal wall excision of a PSMA-detected prostate cancer metastasis

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Abstract
Recent advances in novel functional imaging techniques such as PSMA PET may now offer the ability to identify small volume metastases which may otherwise go undetected. The treatment of these lesions is controversial, particularly in the oligometastatic state. We report the case of an abdominal wall metastasis detected with PSMA imaging which we treated with surgical excision. This resulted in an undetectable PSA 6 weeks post excision.

Keywords Prostate cancer metastasis · Oligometastatic disease · PSMA PET · Robotic excision

Introduction

Local and distant staging of prostate cancer has traditionally been performed using magnetic resonance imaging (MRI), computed tomography (CT) and bone scintigraphy (BS). Metastases detected with these imaging modalities most commonly appear in pelvic lymph nodes and bone with visceral metastasis to lungs and liver much less common. Abdominal wall metastases are extremely rare and generally occur from port-site seeding after minimally invasive techniques [1].

The sensitivity of MRI, CT and BS is limited and as such may lead to the clinical under-staging of metastatic disease. In the setting of biochemical recurrence after definitive therapy, these imaging modalities may not be able to detect micro and small metastases, and they perform particularly poorly when PSA levels are less than 1 ng/ml [2].

Recent advances in novel functional imaging techniques such as PSMA PET may now offer the ability to identify small volume metastases which may otherwise go undetected. With this improved sensitivity there may be concomitant rise in the detection of metastatic lesions in atypical locations [3].

Management of identified lesions in the so-called oligometastatic state (limited metastatic burden amenable to local therapy) in the form of either surgical excision or stereotactic radiotherapy has recently received much attention. Though there is no level I evidence to suggest such targeted therapy improves overall survival, several studies suggest that metastasis-directed treatment delays time to the commencement of androgen deprivation therapy (ADT) [4]. Though the management of metastatic prostate cancer is rapidly evolving, ADT currently remains the cornerstone of treatment. ADT has significant negative medical, metabolic and quality of life implications [5] and thus therapeutic strategies to appropriately delay this therapy may be reasonable.

Case report

A 74-year old male presented with a PSA of 11 ng/ml and a T1c on DRE. He underwent a bilateral incremental nerve sparing robot-assisted radical prostatectomy (RARP) in April 2014 for a diagnosis of high volume Gleason 6 on biopsy. He did not undergo pelvic lymph node dissection at the time of prostatectomy. Post excision, the intact prostate gland was bagged in standard fashion before extraction through the umbilical (camera) port site after completion of the urethrovesical anastomosis. Histological evaluation demonstrated an intact prostatic capsule and more aggressive disease (Gleason 4 + 3, pT3bR1) than the preoperative

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workup suggested. There was a 2-mm positive margin at the right base. PSA nadired at 0.074 ng/ml, then sequentially rose to 1.15 ng/ml in November 2015.

He underwent a PSMA PET scan which showed three avid pelvic nodes, two of which were outside the area that would be considered within the template of extended pelvic node dissection [6]. Post multi-disciplinary review he received stereotactic radiation therapy targeting these nodes. After an initial biochemical response, over 6 months to November 2017 the PSA rose from 0.35 to 0.85 ng/ml.

A repeat PSMA scan demonstrated an isolated focus of avid uptake in the right iliac fossa region located on the anterior abdominal wall (Fig. 1). Initial radiological-guided core biopsy of this lesion was inconclusive. Repeat stereotactic radiation therapy was therefore not considered appropriate (negative biopsy/atypical location).

Though it was noted to be a highly atypical area for prostate cancer metastasis (too low to be considered port site seeding), in the setting of biochemical progression and its isolated PSMA avidity we proceeded to excise the lesion robotically. Due to the skill-set of the senior surgeon, potential depth of invasion and the need for suturing/haemostasis, a robot-assisted approach was preferred over standard laparoscopy.

The lesion was CT localized with a hook wire on the morning of surgery (Fig. 2). Four ports (two robotic and one assistant) were used. Ports were inserted 4 cm cephalad to their normal position used for RARP [7].

Intra-operatively, the lesion was readily identified on the anterior abdominal wall in an area away from the prior port site insertion site. Using the '30-up' telescope, the lesion was excised in entirety with a 1 cm circumferential macroscopic margin (Fig. 3). The lesion itself was located within the posterior fascial sheath, had a complete peritoneal covering and did not appear to extend into rectus abdominis muscle. The bagged specimen was retrieved through the camera port. Histology demonstrated a non-encapsulated deposit of Gleason 4 + 3 prostate adenocarcinoma cells with negative surgical margins. PSA taken 6 weeks following excision of the described lesion was undetectable.

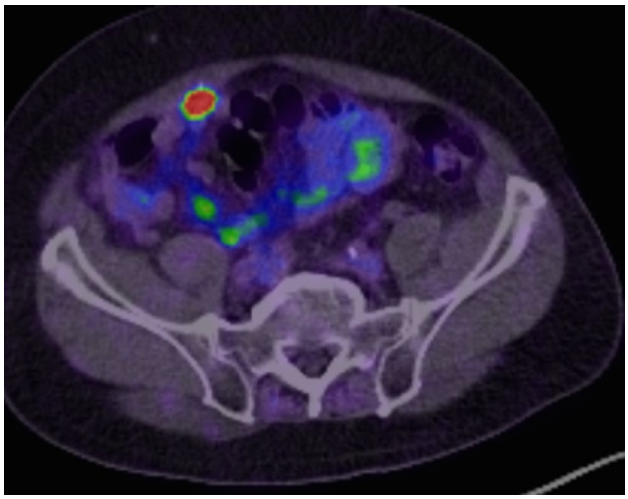

Fig. 1 PSMA PET scan demonstrating location of lesion on the right anterior abdominal wall

Fig. 2 Hook wire placement on anterior abdominal wall

Discussion

Abdominal wall prostate cancer metastasis is exceedingly rare, previously reported only at port/trocar insertion sites. This lesion was clearly unrelated to any of the previous port sites. De novo abdominal wall metastasis unrelated to port

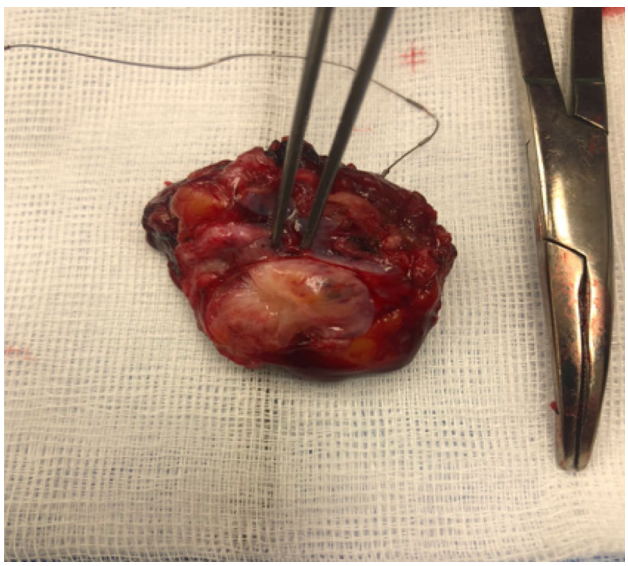

Fig. 3 Excised specimen

site seeding has been described once before [8]. This lesion identified by PSMA scanning after biochemical recurrence following radical prostatectomy was excised by an open approach. Therefore, to the best of our knowledge this is the first reported case of a PSMA identified abdominal wall metastasis to be excised via a minimally invasive robotic approach.

While excision of this lesion is unlikely to be curative, this case highlights an increasingly encountered diagnostic and management dilemma—namely, how best to manage identifiable small volume metastasis in the setting of biochemical recurrence after definitive therapy. Randomized data recently reported from the STOMP trial [9] demonstrated a significant difference in ADT-free survival (21 vs 13 months) in those undergoing metastasis (surgery or stereotactic radiation) directed therapy (MDT) rather than surveillance. If such results can be replicated and delivered with minimal morbidity, MDT may have a role for selected patients.

Compliance with ethical standards

Conflict of interest Authors D. Moran, T. Gross, D. Gavin, A. J. Costello declare that they have no conflict of interest.

Informed consent All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all patients for being included in the study. Written informed consent was obtained from the patient for publication of this Case. Report/any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

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