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Asymptomatic Elevated Alkaline Phosphatase as the Initial Clue to Metastatic Prostate Cancer – A Case Study and Review of Guidelines

Dr Shanur Mohmood Khan[1*], Dr Zuhayr Abdulllah Muazzam[1]

[1]MBBS, MRCGP UK

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***Corresponding author:** Dr Shanur Mohmood Khan
MBBS, MRCGP UK

Abstract **Case Report**

A 60-year-old asymptomatic male was found to have an isolated raised alkaline phosphatase (ALP) level during routine blood tests. Initial liver function investigation, including liver screen and ultrasound, was unremarkable. Further evaluation to identify non-hepatic causes revealed an elevated prostate-specific antigen (PSA). Subsequent investigations confirmed a diagnosis of metastatic prostate cancer with bony involvement, explaining the raised ALP. This case underscores the importance of a thorough diagnostic approach to isolated raised ALP and highlights evidence-based management of suspected prostate cancer.

Keywords: Isolated raised ALP, metastatic prostate cancer, bone metastases, elevated PSA, PIRADS 5 lesion.

INTRODUCTION

Alkaline phosphatase (ALP) is an enzyme found in various tissues, primarily the liver and bones. While raised ALP levels often point to hepatobiliary pathology, bone-derived elevations must also be considered, particularly in older adults [1]. Prostate cancer is one of the most commonly diagnosed cancer in men and a leading cause of cancer-related deaths [2]. Bone is a common site for metastasis [3]. This case illustrates the pivotal role of a non-specific biochemical abnormality in unveiling advanced prostate malignancy.

CASE PRESENTATION

A 71-year-old male with a background of hyperlipaemia, hypertension and type 2 diabetes mellitus attended for a routine health check. He was asymptomatic with no complaints of urinary symptoms, bone pain, weight loss and no family history of cancer.

INITIAL INVESTIGATIONS:

- Liver function tests: Isolated raised ALP at 840 U/L (reference range: 30–130 U/L)
- Gamma-glutamyl transferase (GGT): Normal
- Liver screen: Negative for hepatitis B/C, normal autoimmune markers, ferritin, and ceruloplasmin
- Abdominal ultrasound: Normal hepatobiliary architecture

In view of normal hepatic investigations, bone-derived causes were considered. The patient underwent further evaluation:

- PSA: Elevated at 53 ng/mL (reference <4.0 ng/mL)
- Digital rectal examination (DRE): Firm, irregular prostate
- Prostate MRI: PIRADS 5 lesion
- CT chest, abdomen and pelvis: lung metastases, liver metastases, mediastinal and retroperitoneal lymphadenopathy and widespread skeletal metastases.
- Bone scintigraphy: Multiple osteoblastic bone metastases
- Prostate biopsy: Adenocarcinoma

DIAGNOSIS

The patient was diagnosed with metastatic prostate adenocarcinoma (T3 N2 M1) with bony metastasis, accounting for the elevated ALP.

DISCUSSION

This case highlights the need for a high index of suspicion when evaluating isolated raised ALP, particularly in older men. Bone metastases from prostate cancer can be osteoblastic, leading to increased ALP due to elevated osteoblastic activity [4].

DIFFERENTIAL DIAGNOSIS OF RAISED ALP [5]:

- Hepatobiliary disease
- Bone disorders (Paget's disease, fractures, metastases)
- Physiological causes (growth, pregnancy)
- Rare causes (infiltrative disease, chronic kidney disease)

In this patient, normal liver investigations and imaging directed the clinical team towards bone and prostate as potential sources.

MANAGEMENT BASED ON GUIDELINES

Initial Steps in Suspected Prostate Cancer [6, 7]:

- PSA testing is appropriate in men over 50 with suggestive symptoms or abnormal findings.
- DRE to assess prostate size and character.
- Multiparametric MRI is recommended prior to biopsy.
- Biopsy for histological confirmation.

Management of Metastatic Disease [8]:

- Androgen deprivation therapy (ADT) with LHRH agonists or antagonists Docetaxel chemotherapy considered upfront for hormone-sensitive metastatic prostate cancer
- Bone health management: Zoledronic acid or denosumab to prevent skeletal-related events
- Radiotherapy may be offered for symptom control
- Palliative care support for advanced disease

OUTCOME

The patient was commenced on LHRH analogue therapy. He was also started on zoledronic acid for bone protection and neo adjuvant chemotherapy and continued oncology input.

CONCLUSION

This case exemplifies the diagnostic value of a systematic approach to an isolated biochemical abnormality. An elevated ALP, though non-specific, can serve as a crucial early clue to serious underlying pathology. Clinicians should maintain vigilance and pursue further investigation when routine tests yield unexplained abnormalities, particularly in older men, to ensure timely cancer diagnosis and intervention.

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