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Case Report

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Disseminated Intravascular Coagulation as a Result of Metastatic Prostate Cancer: A Case Report

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Abstract

Disseminated intravascular coagulation (DIC) is an acquired syndrome that develops as a result of an underlying disorder, and is characterized by a consumptive coagulopathy that induces hemorrhage and microclot formation. Most frequently, it develops as a result of sepsis and trauma, but can infrequently be induced secondary to malignancy. Herein, we outline the management of a patient with an occult diagnosis of metastatic prostate cancer who presented with DIC.

Keywords: Prostate cancer; DIC; Metastatic prostate cancer

Introduction

This case report documents the unusual presentation of a patient who developed disseminated intravascular coagulation (DIC) and was subsequently diagnosed with metastatic prostate cancer as the causative factor.

Case Report

A 69-year-old white male presented to the Emergency Department with a 3-day history of right upper arm weakness, visual disturbance and an abnormal gait. His past medical history was significant only for hypertension and osteoarthritis. The admitting doctor noted objective weakness in the right upper limb along with a right homonymous hemianopia and multiple right cerebellar signs. His critical observations were normal, and the remainder of his physical examination was non-contributory.

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Initial laboratory investigations revealed an elevated international normalized ratio (INR) of 1.5 (normal: 0.9 - 1.1) despite the absence of anticoagulation therapy. Platelet levels were decreased at 114 × 10^9/L (normal: 140 - 440 × 10^9/L). Hemoglobin was unremarkable at 14.6 g/dL (normal: 14.0 - 17.4 g/dL). His prothrombin time was 15.7 s (normal: 9.7 - 11.3 s), and a blood film demonstrated true levels of decreased platelets with no clumping. A fibrinogen level was 0.5 g/L (normal: 1.5 - 3 g/L), and D-dimers were 57.76 (normal: < 0.5 µg/mL).

Shortly after admission, the patient developed epistaxis and bleeding from the mucus membranes within his oral cavity. This prompted urgent review by the hematology team, who diagnosed DIC. He was treated with transexamic acid, fibrinogen and vitamin K which reduced the volumes of hemorrhage.

The patient underwent a computed tomography (CT) study of brain that demonstrated multiple areas of low attenuation within both cerebral hemispheres which were suspicious for metastatic deposits. A magnetic resonance imaging (MRI) study confirmed multiple cerebral and cerebellar infarcts that were once more consistent with metastatic disease. A CT of thorax, abdomen and pelvis failed to demonstrate any primary neoplasm which may have been the source of the brain metastases, and in particular, did not demonstrate any significant lymphadenopathy. A bone scan noted multiple thoracic vertebral and scapular lesions consistent with bony metastatic disease.

At this point a prostate specific antigen (PSA) level was obtained, and was abnormal at 2,285 µg/L (normal: 0 - 4 µg/L).

A digital rectal examination (DRE) noted a clinically advanced stage of prostate cancer. A clinical and biochemical diagnosis of metastatic prostate cancer was made, as initial tissue diagnosis was contraindicated due to the presence of bleeding diathesis. The patient was treated with an immediate subcutaneous dose of 240 mg degarelix (a gonadotropin releasing hormone antagonist: GnRHa) which was continued at an 80 mg dose once monthly.

The patient's bleeding symptoms subsided, and within days normalization was noted in his hematological and biochemical indices. He underwent further rehabilitation and was discharged to a convalescence center 1 month after admission. A follow-up review performed 4 months after initial presentation, noted all hematological markers had returned to normal

ranges and a PSA had reduced to 34.14 μg/L.

Discussion

Advanced prostate cancer varies in presentation: most frequently anemia, weight loss, bone pain or spinal cord compression, but the current literature notes a number of case reports where DIC was a presenting feature [1-3]. DIC is the most frequent coagulopathy in patients with prostate cancer and is thought to be present in up to 30% of patients with metastatic tumors [4].

Dysregulation of coagulation and fibrinolysis pathways characterize DIC, resulting in paradoxical bleeding and microthrombi formation. Tissue factor (TF) is a transmembrane glycoprotein with a role in triggering DIC [5]. TF is known to be released following exposure to inflammatory cytokines (interleukin-1 (IL-1)), tumor necrosis factor (TNF) [6] - mediators which can be produced by prostate cancer cells. TF binds with activated factor VIIa leading to downstream formation of thrombin and fibrin. Urokinase-type plasminogen activator (uPA) also produced by prostate cancer cells converts plasminogen to plasmin: a fibrinolytic protease [7]. These cytokines are the likely cause of DIC activation as a result of advanced prostate cancer.

Degarelix is a GnRHa with an immediate onset of action. It binds to GnRH receptors within the pituitary, thereby rapidly reducing levels of luteinizing hormone (LH), follicle stimulating hormone (FSH) and hence testosterone. Unlike GnRH agonists, or LH-releasing hormone agonists or antagonists, Degarelix does not cause an initial stimulation of the hypothalamus-pituitary-gonadal axis, and therefore, does not cause an initial surge in testosterone or clinical "flare". Ergo, there is no requirement for anti-androgen therapy and it has an immediate onset of action, and so is useful clinically to gain timely control of advanced disease.

The role of degarelix in the management of metastatic prostate cancer is well documented [8], but its role in the treatment of DIC needs further investigation. Our case report demonstrates the clinical benefit obtained from degarelix treatment in DIC caused by advanced prostate cancer, but its mode of action may not be solely limited to decreasing traditional neoplastic cytokine production.

Author Contributions

Each author has contributed intellectually to this case report.

Conflict of Interest

There are no conflicts of interest regarding this document.

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