CASE REPORT

Multiple myeloma in a young patient

Mieloma múltiple en un paciente joven

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ABSTRACT

Multiple myeloma is a type B blood cancer characterized by clonal proliferation of malignant plasma cells. The median age at diagnosis is 70 years, however, it is rare among younger patients, and less than 0.5% are younger than 30 years. A 33-year-old man, who began with progressive acute kidney injury is presented, accompanied by a severe lower back pain and impossibility to walk. A dorso-lumbar spine CT scan showed an extensive process consisting of multiple osteolytic lesions at T12, L2, ribs, pelvic and proximal femur. Radiology, along with histology, bone marrow aspiration and protein electrophoresis analysis allowed to establish the diagnosis of stage III multiple myeloma, after which the patient received chemotherapy. Despite the rarity of multiple myeloma among young patients, this diagnosis should be evoked when clinical, biological and radiological signs are in favour. There appears to be no difference between younger and older patients in disease presentation, although longer survival was reported among younger patients.

Keywords: multiple myeloma; protein electrophoresis; osteolytic lesions; treatment

RESUMEN

El mieloma múltiple es un cáncer de sangre tipo B caracterizado por la proliferación clonal de células plasmáticas malignas. La edad promedio en el momento del diagnóstico es de 70 años, sin embargo, entre los pacientes más jóvenes son raros y menos del 0,5% de los pacientes diagnosticados tienen menos de 30 años. Se presenta el caso de un hombre de 33 años que inició con daño renal agudo, acompañado de dolor severo en la región baja de la espalda lo que le imposibilitaba caminar. Una tomografía computarizada de columna dorso-lumbar mostró un proceso extenso con múltiples lesiones osteolíticas en T12, L2, pelvis y fémur proximal. El examen histológico con aspiración de médula ósea y análisis inmunohistoquímico mostró un plasmocitoma y el diagnóstico de mieloma múltiple sintomático. Una vez establecido el estadio III, recibió ciclos de quimioterapia. A pesar de la rareza del mieloma múltiple entre pacientes jóvenes, este diagnóstico debe plantearse cuando los signos clínicos, biológicos y radiológicos sean sugestivos. No parece haber diferencias entre los pacientes más jóvenes y los de mayor edad en la presentación de la enfermedad, aunque se informa una supervivencia más larga entre los pacientes más jóvenes.

Palabras clave: mieloma múltiple; electroforesis de proteínas; lesiones osteolíticas; tratamiento

INTRODUCTION

Multiple Myeloma (MM) is a type B blood cancer characterized by clonal proliferation of malignant plasma cells that accounts for approximately 10% of all hematologic malignancies.[1] The risk of multiple myeloma increases with age, peaking around age 70.[2] Cases among younger patients are rare. According to recent data from the National Cancer Institute's (NCI) Surveillance, Epidemiology, and End Results (SEER) program, MM is more common in men than women, occurring most often between the ages of 65 to 74 years, with a mean age at diagnosis of 69 years. The incidence of myeloma below the age of 30 years is extremely low. SEER recently reported an incidence between 20-34 years, 35-44 years, 45-54 years, and 55-64 years of 0.5%, 2.7%, 10.6%, and 23.2%, respectively.[3]

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CASE PRESENTATION

A 33-year-old man, weighing 80 kg and 175 cm of height, with no relevant past history of illness, complained of difficulty for urination for the last 24 hours, associated to severe fatigue, headache and generalized muscle pain. On physical examinationt, pulse was 110 beats per minute, blood pressure of 160/90 mmHg and respiratory rate of 20 breaths per minute. Mucous membranes were pale. The rest of the physical exam was normal. The patient was admitted for further study and treatment.

Blood tests at the time of admission

CBC (Hb 7.4g/dl, Ht 34%, WBC 2 x10^9/L, Plateles 235x10^9/L, PT: 14s, PTT 34s

BUN 48.4mg/dl, Creatinine 7.0mg/dl, Urea 103mg/dl, Calcium 14.8mg/dl, ESR 134mm/h

Pan Abdominal USG: Enlarged kidneys with diffuse hyperechoic cortex.

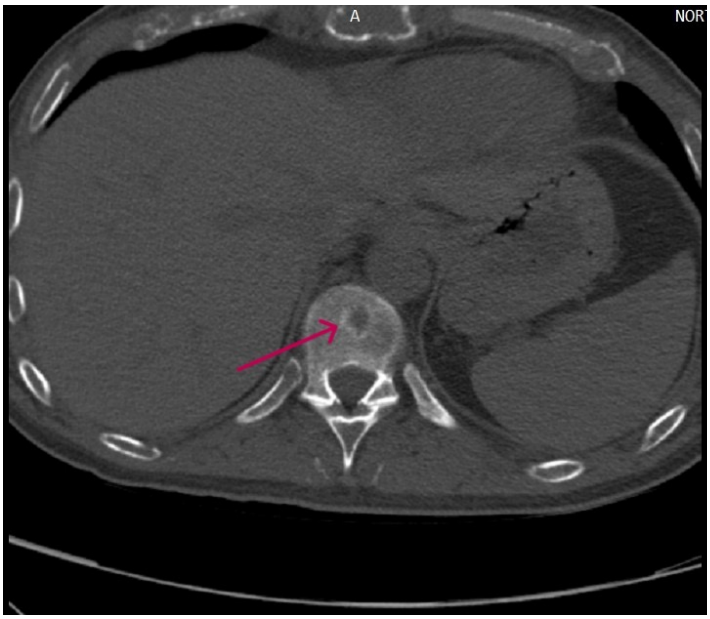

Fig 1. Thoraco-lumbar spinal CT scan. Axial view. Vertebral osteolytic lesion in L2 (red arrow)

An initial clinical diagnosis of progressive acute tubulo-interstitial nephritis was made. A nephrologist was consulted, and medical treatment was initiated. During hospitalization he had severe sepsis secondary to bacterial pneumonia. After a few days of hospitalization with intravenous antibiotics and other medical treatment, his kidney function improved. However, he began with a severe lower back pain with inability to walk. A thoraco-lumbar spinal CT scan reported multiple osteolytic lesions in T12-L2, ribs and pelvic (Fig. 1, 2). A new diagnosis of MM was considered, and he was referred to the hematologist for bone marrow aspiration and protein electrophoresis. A confirmatory test for MM was performed.

DISCUSSION

MM is a malignant tumor that develops in the bone marrow and causes disseminated bone destruction.[4] The disease accounts for about 1% of all malignancies and is considered the second most common onco hematological disease, and 13% of hematologic cancers worldwide, only surpassed by lymphomas.[5] The estimated incidence of new cases of Multiple Myeloma in the United States is approximately 32,270 cases, and 12,830 deaths (2.1% of all cancers) in 2020.[6] Its prevalence is higher from the fifth decade of life, rarely occurs before 30 years of age, and men are slightly more affected than women, with blacks being twice as affected as whites.[7]

It is a B-cell malignancy characterized by clonal proliferation of malignant plasma cells in the bone marrow microenvironment, production of a monoclonal protein (M protein) present in blood or urine, associated with organ dysfunction and has been linked to bone destruction.[8]

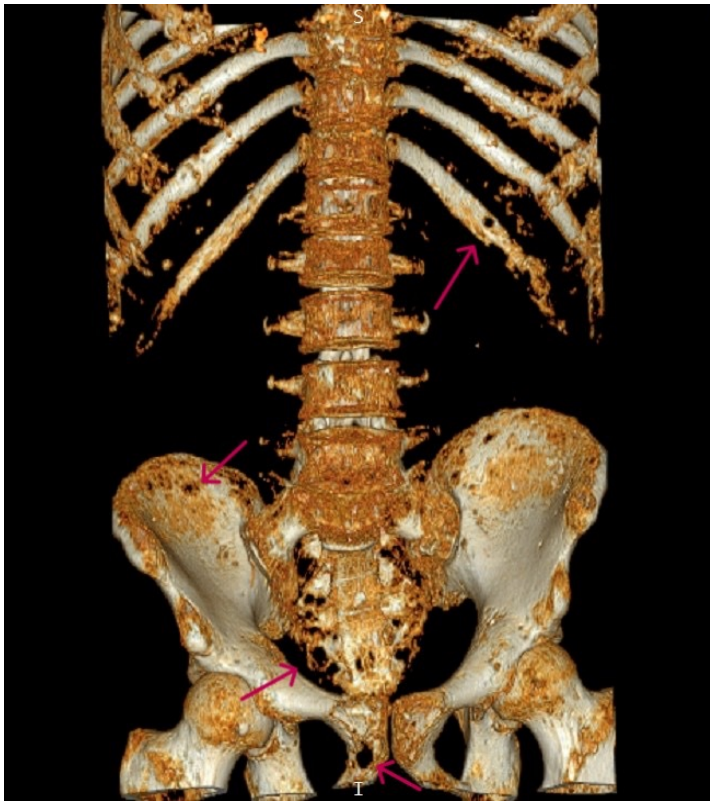

Fig 2. Thoraco-lumbar spinal CT scan. Volumetric view. Multiples osteolytic lesions in ribs, sacral and pelvic bone. (red arrows)

The first clue was the presence of myeloma cells and a high number of osteoclasts at the sites of bone destruction. The study of the mechanisms evolved from the observation that myeloma cells produce osteoclast-activating factors (FAOs) to the characterization of local cytokines such as IL-1B, IL-6, and TNF-a and B, all of which are important for increasing osteoclast production and activity. After this, a substance called ligand RANK (RANK L) has been identified as a key mediator for osteoclast activation. The balance between osteoclast and osteoblast function is responsible for normal bone repair and remodeling, which is disrupted in myeloma cases.[1]

Of the individuals who have MM, about 66% have no symptoms or have nonspecific symptoms, making the diagnosis based on clinical signs, so it is often incorrect.[9]

Of those who are symptomatic, 58% have constant bone pain. Bone pain is the most characteristic symptom present, with the pelvis, skull, sternum, ribs, clavicles and jaws being the places that can be affected. Bone can be reabsorbed, leading to excess calcium in the blood, central or peripheral nervous system deficiencies, and loss of sensation and mobility.[10]

Most cases progress with severe anemia and renal failure due to hypercalcemia as in our case. A recent review 15 showed that a high percentage of MM patients have severe anemia, probably due to advanced disease and kidney failure. The results also showed a significant increase in creatinine as in our case.

Fever may be present due to neutropenia, which increases susceptibility to infections.[11] In our case, severe sepsis due to bacterial pneumonia was reported. MM is considered an incurable but treatable disease.

Radiologically, our patient had multiple osteolytic skeletal lesions that were described as frequent among young patients in most series, especially in those under 30 years of age. Blade et al 12 have found osteolytic lesions in 6 out of 10 patients in one report, radiological examination in the study by Usha et al. has revealed lytic lesions in almost all cases with femur and rib fracture in 28.57% of cases.[13]

Some measures are part of the treatment such as, prevention and treatment of hypercalcemia, bone lesions and pain control.[14] In this clinical case, multiple osteolytic and pathological fractures were found, however, the patient did not present pain at the onset, being acute renal failure the initial presentation.

A variety of pain medications and procedures are available to relieve discomfort. Therefore, it is a disease that can be treated and controlled for a long time, and patients can a good quality life, with little interrupted activities, if their treatment and follow-up are carried out correctly. Considering that the impaired function of the various types of immune cells ends up favoring the spread of the tumor and consequently its growth, in recent years researchers have dedicated themselves to the study of immunotherapy using dendritic cells, natural killer cells and genetically modified T cells that represent a new therapeutic era. The application of these treatments is growing rapidly, based on their ability to eradicate multiple myeloma.[16]

CONCLUSIONS

It is important to note that, in clinical practice, in young patients presenting with anemia, bone pain, spinal cord compression syndrome and/or renal failure, the possibility of MM should be investigated, allowing diagnosis and early initiation of treatment. Therefore, it is known that an effort to better disseminate information about MM our environment is urgent since early diagnosis has an impact in terms of survival and in reducing the progression of symptoms.

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