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Hip pain and childhood malignancy

臀痛與孩童期的惡性疾病

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In children, neuroblastoma can mimic various orthopaedic pathologies and this may create difficulties for doctors in reaching the correct diagnosis. Stage IV neuroblastoma was initially diagnosed as transient synovitis in this case report of a 7-year-old girl presenting with hip and low back pain.

在兒童中，神經母細胞瘤的病徵可能與各種矯形外科病的狀況相似，使醫生難以作出正確的診斷。本病例報告討論一名出現臀和腰背痛的七歲女童，病者的第四期神經母細胞瘤最初被診斷為短暫性滑膜炎。

Introduction

Neuroblastoma is one of the most common solid tumours occurring in childhood, accounting for 10% to 12% of childhood cancer cases.^{1,2} Often involving the musculoskeletal system, neuroblastoma can mimic a variety of orthopaedic pathologies at presentation. This case report highlights the importance of considering malignancy in the differential diagnosis of childhood hip pain, despite its rarity.

Case report

A 7-year-old girl was admitted to the Department of Paediatrics, North District Hospital, with a 2-month history of left hip pain and low back pain. Symptoms of fever (temperature, 38.5°C), abdominal pain with constipation for 2 days, difficulty in squatting, and a limping gait were reported. The girl's mother recalled that the child slipped and fell approximately 2 weeks before admission. The child had no symptoms of urinary tract infection or weight loss. At physical examination, blood pressure and pulse rate were normal. There was no evidence of organomegaly or abdominal mass. No local tenderness was detected over the spine or left hip. A slight decrease in flexion of the left hip was noted. The child was able to squat with some difficulty, to fully extend her hips, and to bend forward normally. An abdominal X-ray showed faecal loading in the colon. X-rays of the left hip, lumbar spine, and pelvis were unremarkable. Her fever subsided and the limp improved. A complete blood count showed normal haemoglobin, platelet, and white cell counts. The erythrocyte sedimentation rate (ESR) of 60 mm/h (normal range, 0-20 mm/h) was high, however. The patient was transferred to the Department of Orthopaedics and Traumatology with suspected contusion of the left hip. Ultrasonography detected fluid inside the left hip joint and guided-aspiration was performed. The clear, straw-coloured fluid aspirated (2 mL) showed no growth in bacterial culture. The left hip pain gradually subsided and the diagnosis of transient synovitis of the left hip was made.

The girl was admitted to the Department of Orthopaedics and Traumatology 1 month later, complaining of intermittent right hip pain and low back pain. She had a history of 'slipping and falling' in the swimming pool approximately 2 weeks before the second admission. Since then, she had complained of intermittent right hip pain, a limping gait, and nocturnal pain over the neck, back, and sternum. On the day before admission, her right hip pain was so severe that she could not walk. She was, however, asymptomatic when admitted. At physical examination, gait was normal and she could squat without any difficulty. There was non-specific, mild tenderness over the region of the lumbar spine. There was

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full range of movement at both hip joints without pain. No mass was detected during abdominal examination. X-ray findings were unremarkable. An urgent ultrasonographic examination showed a mild swelling of the right hip joint capsule but no pelvic mass. The patient was mildly anaemic (haemoglobin level, 10.6 g/L; normal range, 11.5-14.5 g/L) and her ESR was significantly elevated (116 mm/h). Magnetic resonance imaging (MRI) of the hips and pelvis was undertaken privately and revealed multifocal abnormal bone marrow signals. In view of the significantly raised ESR, the radiologist suggested the diagnosis of multifocal osteomyelitis. On the day of the MRI scan, the patient developed fever and leukopenia, and the ESR was further elevated (127 mm/h). Consequently, the child was seen by the Department of Paediatrics, North District Hospital, for further care. The private MRI films were reviewed by a radiologist at the hospital, and a suspected diagnosis of haemopoietic disease involving the bone marrow was suggested. Urgent ultrasonography of the abdomen was completed and detected an 8-cm, well-defined, round, heterogeneous, hypoechoic suprarenal lesion. An urgent computed tomography scan with contrast of the abdomen was suggestive of a right adrenal neuroblastoma (Fig). The child was transferred to the Child Cancer Centre at Prince of Wales Hospital for further management. At admission, the general condition of the child was satisfactory. She did not appear pale. There was no lymphadenopathy or abdominal mass detected. Ultrasonography-guided right adrenal biopsy showed ganglioneuromatous lesions. A bone scan detected multiple bony metastases. Bone marrow study showed heavy infiltration of malignant cells and the diagnosis of stage IV neuroblastoma was confirmed. She was subsequently treated according to the Hong Kong Neuroblastoma 99 Protocol.

Discussion

Hip pain is not uncommon in childhood. The most important clinical dilemma is the difficulty in distinguishing benign and self-limiting disorders, for example, transient

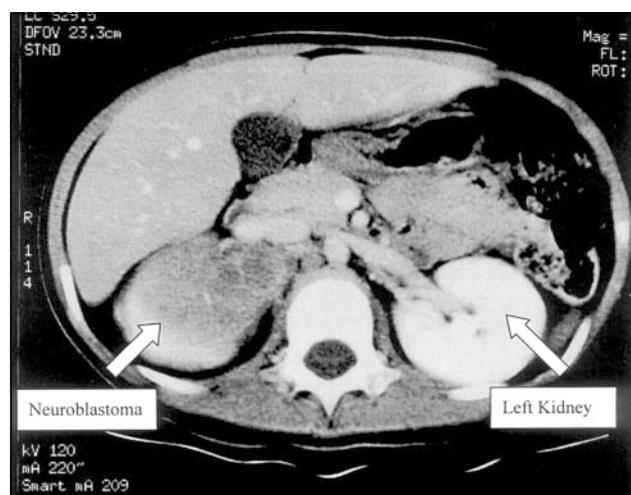


Fig. Computed tomography of the abdomen with contrast shows right adrenal neuroblastoma

synovitis, from those that cause significant morbidity and mortality such as septic or malignant processes. With respect to this patient, there were no symptoms of hip pain or limping after discharge or during out-patient follow-up. A treatment plan for classical transient synovitis was followed. Although symptoms did not persist and the child was symptom-free for 1 month after the first admission, her abnormally high ESR result at that admission highlighted the value of an elevated ESR as an important warning sign for clinicians. Huttenlocher and Newman³ found that a high ESR (>50 mm/h) was a surprisingly good indicator of serious disease in children (eg juvenile rheumatoid arthritis, osteomyelitis, malignancy, etc), particularly in patients presenting with a limp.

Neuroblastoma has an annual incidence of 6.5 to 10.5 new cases per 100 000 in children younger than 15 years, with approximately 80% of cases presenting prior to the age of 5 years.¹ It commonly presents with atypical symptoms.⁴ The neuroblastoma is found in the abdomen in approximately 70% of cases and most commonly involves the adrenal glands. Approximately 20% of tumours are found in the chest.⁵ Metastasis to bone marrow, bone, and liver through the haematogenous route is common. Accordingly, metastatic neuroblastoma is evident at initial clinical presentation in approximately 60% to 75% of cases.^{5,6} Aston's study⁷ showed that 15% of children with neuroblastoma presented with hip pain and limping as the initial complaints. With respect to bony metastasis, metastatic neuroblastoma is most commonly found in the axial skeleton and in the proximal portions of the appendicular skeleton.

Children with metastatic neuroblastoma may be admitted or referred to the orthopaedic unit for their orthopaedic complaints and the proper diagnosis may then be delayed. The mean time between disease onset and final diagnosis of malignancy was found to be 2.5 to 3.2 months.^{8,9} Severe anaemia (haemoglobin level, ≤ 77 g/L) is an important finding that can help to distinguish a malignant process (eg neuroblastoma) from septic arthritis of the hip.⁷ Aston⁷ suggested that a febrile child who presented with irritable hip should undergo ultrasonography and hip aspiration to rule out infection. If the results were equivocal, especially if the initial complete blood count revealed unexplained anaemia and an ESR greater than 80 mm/h, bone marrow aspiration should be performed. Trapani et al⁹ showed that the simultaneous presence of high lactic dehydrogenase (LDH) levels and a raised ESR or C-reactive protein level in children, even in the presence of normal blood cell counts, should alert the clinician to perform additional investigations to exclude malignancy in the musculoskeletal system. Plain radiographs are insensitive to destruction of less than 30% of the bone matrix, and therefore often fail to detect bony metastases even when the bone involved is correctly identified clinically.¹⁰ As metastatic neuroblastoma has a predilection for cortical bone and bone marrow, a technetium 99 bone scan is an essential part of the initial evaluation.¹¹ Skeletal scintigraphy

demonstrates sites of metastatic disease more accurately than plain radiography and also helps to differentiate osteomyelitis from metastatic neuroblastoma.¹⁰ In children younger than 1 year, however, bone scanning may show so much activity that it is difficult to detect small lesions. It is recommended that skeletal surveys be performed in this age-group instead of, or in addition to, a technetium 99 bone scan.¹² Iodine-123 meta-iodobenzylguanidine scintigraphy is also a sensitive test for bone marrow metastases.

In summary, the most helpful clues to a possible diagnosis of malignancy in children presenting with hip pain are anaemia, a raised ESR (>50 mm/h), a raised LDH, and bone scan findings.

Conclusions

In childhood, neuroblastoma often involves the musculoskeletal system and thus it can mimic a variety of orthopaedic problems at presentation. The history and physical examination can be misleading, and haematological and X-ray investigations are usually inconclusive. For children presenting with hip pain who have an increased ESR and/or anaemia, a routine bone scan is highly recommended. Apart from a high index of suspicion clinically, the presence of anaemia, a raised ESR, a raised LDH, and bone scan findings should alert the clinician to consider the diagnosis of neuroblastoma as the cause of hip pain. This case report indicates that malignancy should be considered in the differential diagnosis of hip pain in children despite its

rarity. Early diagnosis is the key to effective treatment and can ameliorate the devastating outcome of this condition.

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