CASE STUDY

CONTENTS

From hip pain to MAS: A case of gonococcal arthritis in a child

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ABSTRACT

Joint pain in children presents a diagnostic challenge due to its multifaceted etiology, ranging from musculoskeletal injuries to systemic infections. This case report details a 3-year-and-5-month-old girl with bilateral hearing impairment and congenital cytomegalovirus infection, who was admitted with thigh pain, high fever, and difficulty walking. Despite being hemodynamically stable and without apparent infection signs, extensive diagnostic evaluations revealed gonococcal hip arthritis. This condition, caused by Neisseria gonorrhoeae, is unusual in young children and typically associated with perinatal transmission or sexual abuse. The diagnosis was confirmed through molecular testing, highlighting the importance of considering rare etiologies in pediatric joint pain cases. The patient's management included multidisciplinary consultations, various imaging and laboratory tests, and specific antimicrobial therapies. The case underscores the necessity of a comprehensive diagnostic approach in pediatric patients with joint pain, especially when associated with other health conditions, to ensure accurate diagnosis and appropriate treatment.

KEY WORDS: gonorrhea, neisseria gonorrhoeae, septic arthritis, child, macrophage activation syndrome

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INTRODUCTION

Joint pain in children is a common issue frequently encountered by primary care doctors, particularly in pediatric clinics or emergency rooms. This condition can have various causes, which makes diagnosis difficult. Causes of joint pain in children include direct injuries like sprains or fractures, as well as inflammatory conditions such as reactive or purulent arthritis, juvenile idiopathic arthritis (JIA) [1], Legg-Calve-Perthes disease, or Slipped Capital Femoral Epiphysis. Juvenile Idiopathic Arthritis has several subtypes, some of which may be complicated by macrophage activation syndrome (MAS) – a serious hyperinflammatory condition that requires prompt diagnosis and treatment [2].

Other rare causes include infections like septic arthritis and systemic diseases such as systemic lupus erythematosus (SLE) or Kawasaki disease, which can also present with joint pain [3, 4]. Additionally, benign conditions like growing pains can cause significant discomfort, especially in the lower limbs, usually at night [5]. The diagnostic challenge is increased by the variety of symptoms, which may include pain, swelling, redness, and limited movement [6]. Accurate diagnosis is essential for guiding appropriate treatment, which can range from simple pain relief to more intensive therapies for severe or chronic conditions.

Gonorrhea is an inflammatory disease caused by the gram-negative bacterium Neisseria gonorrhoeae, transmitted through sexual contact (STI). At-risk groups include men who have sex with men, those who do not use physical contraception during intercourse, individuals with a history of STIs, and people with low socioeconomic status [7, 8]. Newborn infections occur due to transmission of gonococci during childbirth through natural pathways. In older children, it may also result from sexual abuse [9]. Colonization most commonly occurs in the mucous membranes of the genital organs; however, this bacterium has also been confirmed to affect other organs such as the eyeball, nasopharynx, anus, and joints like the hip, knee, and elbow [10-12]. As a result of infection, patients may experience symptoms such as fever, discharge, intermenstrual bleeding, pain during intercourse, purulent discharge from the penis, painful or swollen testicles, rectal bleeding, rectal itching, rectal pain, and pain or

burning during urination. In cases of joint inflammation, local symptoms include redness, pain during movement or at rest in the affected limb, tenderness on palpation, and swelling over the joint. Due to the most common site of inflammation, there is a risk of spreading to the pelvic organs, leading to pelvic inflammatory disease (PID) [8].

An illustrative case is described by Kumar et al., in which a child presented with arthritis of the knee as the initial sign of disseminated gonococcal infection, despite the lack factors [13]. This emphasizes the importance of maintaining a broad differential diagnosis in pediatric patients with joint complaints, including rare infectious etiologies such as gonorrhea.

According to the epidemiological report from the European Centre for Disease Prevention and Control, in 2022, 70,881 cases of gonorrhea were reported across 28 European Union/Economic Area countries. This amounts to 17.9 cases per 100,000 people and represents a 48% increase compared to 2021 and a 59% rise from 2018. Age-dependent rates were highest in the 20-24 age group for both men and women, with over half of the reported cases (60%) involving men with homosexual contact [14].

AIM

The objective of this case report is to highlight the problematic diagnosis of arthritis in children with existing other diseases and/or syndromes, emphasize the most important diagnostic tests when suspecting arthritis in children and resent a rare case of gonococcal arthritis in this age group.

CASE REPORT

A 3-year and 5-month-old girl was admitted to the Emergency Department of the University Children's Hospital in Lublin on June 27, 2021 late in the evening. She exhibited symptoms persisting for three days before admission, including groin pain, elevated body temperature up to 39°C, limping, and difficulty walking. The patient has a history of congenital cytomegalovirus (CMV) infection and bilateral hearing impairment, as well as cerebral palsy classified as level I according to the Gross Motor Function Classification System (GMFCS). Upon examination, she was hemodynamically stable with no meningeal irritation. The abdominal exam was unremarkable, vesicular breath sounds were present, and the abdomen was soft and pulsatile. The throat exam showed no abnormalities. Laboratory tests were ordered, including serum C-reactive protein (CRP) level and a complete blood count with an automatic differential. Elevated levels of CRP at 11,9 mg/dL (normal range 0-0,5 mg/dL), leukocytes at 17,14 x10^^{3}/mm^3, and neutrophils at 11,38 x10^^{3}/mm^3 indicate an ongoing inflammatory process. An ultrasound examination revealed an increased exudation in the hip joints. Combined with the symptoms presented by the patient, this led the medical team to suspect septic hip arthritis, and the patient was admitted to the Pediatric Orthopedics Department for further treatment.

The patient was hospitalized from June 27, 2021, to July 14, 2021, in the Pediatric Orthopedics Department of University Clinical Hospital in Lublin, and from July 14, 2021, to July 22, 2021, in the Pediatric Pulmonology and Rheumatology Clinic of the same hospital.

Soft tissue and full hip joint ultrasounds were performed the next day morning. The ultrasound of the left hip showed a moderately increased amount of fluid, signs of increased vascularization on Power Doppler, and an anterior recess measuring 11 mm in height. Similarly, there was an increased amount of fluid in the right hip joint, with the fluid thickness in the anterior recess measuring 6 mm, along with signs of increased vascularization of the joint capsule and surrounding tissues. Arthrotomy is the preferred treatment for septic arthritis. In this case, the decision was made to perform a left hip joint arthrotomy and right hip joint aspiration in the afternoon, immediately after an ultrasound examination revealed joint effusion and signs of inflammation. The empirically administered antibiotic prior to the procedure was cloxacillin. The pus obtained from the left hip joint and inflammatory joint fluid was submitted for bacterial culture. No bacterial growth was detected.

During hospitalization in the Orthopedics Department, a series of laboratory and imaging tests were conducted. These included a chest X-ray (which showed no pathology), an abdominal X-ray in the left lateral decubitus position (which showed no pathology), an echocardiogram (revealing normal heart anatomy and function), and an abdominal ultrasound.

Biochemical blood tests showed elevated ESR (120 mm/hr, normal range 2-15), decreased albumin level (2.45 g/dl, normal range 3.8-5.4), elevated ALT (106.6 U/l, normal range 0-39), decreased amylase level (18.97 U/l, normal range 28-100), elevated CRP (27.64 mg/dl, normal range 0-0.5), increased alpha-1 globulin (5.8%, normal range 2-3.4), increased alpha-2 globulin (19.1%, normal range 8.7-14.6), elevated LDH (1778 U/l, normal range 0-615), high ferritin level (17240 ng/ml, normal range 6-67), and elevated glucose level (113 mg/dl, normal range 70-99). Specialized tests revealed elevated CK-MB (30.3 U/l), normal RF and ASO levels, and elevated pro-BNP (389.3 pg/ml). Coagulation tests revealed elevated D-dimer levels (5760 ng/ml; normal range <500) and a prolonged prothrombin time (14.7 seconds; normal range 10.6-14.2). Inflammatory markers were also tested, showing a high procalcitonin level (21.1 ng/ml; values above 10 indicate severe bacterial shock or sepsis) and an elevated IL-6 level (50.6 pg/ml, normal range 0-7).

Virological and serological tests showed an indeterminate result for the *Mycobacterium tuberculosis* Quantiferon test, a

Table 1. Pharmacological treatment

Antibiotic therapy	**Cloxacillin 4 × 500 mg**	**Day 1 to Day 5**
	Cefotaxime 3 × 500 mg	Day 5 to Day 8
	Vancomycin 4 × 100 mg, then increased to 4 × 250 mg	Day 8 to Day 18
	Meropenem 3 × 320 mg, then 3 × 600 mg	Day 8 to Day 18
	Clindamycin 1 × 150 mg	Day 9 to Day 13
	Trimethoprim–sulfamethoxazole 2 × 3 ml, then 2 × 5 ml	Day 14 to Day 18
	Fluconazole 1 × 100 mg	Day 12 to Day 18
Parenteral nutrition	Numeta G16E, 300 ml	Day 12 to Day 18
Supplementation	Soluvit N (formerly: Sluvit N) 5 ml; Peditrace 10 ml; Vitolipid N 5 ml	
Additional medications	Paracetamol (acetaminophen); Ibuprofen; Morphine; Metamizole (dipyrone); Lactobacillus rhamnosus GG (formerly: LactoDR); Probiotic multistrain preparation (formerly: Synbiox Baby); Ondansetron; Fluid therapy	

Source: Own materials

non-reactive Wassermann test, and a non-reactive HIV test. Additionally, a positive SARS-CoV-2 IgM result was found, with negative IgG, PCR nasal swab, and antigen test results.

Despite joint arthrotomy, no improvement in the child's general condition was observed. The arthrotomy of the hip joint was repeated 7 days after the primary procedure. A sample of joint fluid was sent to a molecular testing laboratory for a PCR test. *Neisseria gonorrhoeae* genetic material was detected. In the given situation, additional tests for sexually transmitted diseases were performed. Antibodies to *Chlamydia pneumoniae*, *Chlamydia trachomatis*, *Yersinia*, and *Toxoplasma* were negative. A gynecological examination revealed an intact hymen and an anovaginal area.

A positive *Neisseria gonorrhoeae* result from molecular testing of joint content prompted a consultation with the National Consultant for Microbiology. Continuation of meropenem (3×600 mg, 2-hour infusions) and an increased dose of vancomycin (4×250 mg) with therapeutic drug monitoring was recommended. Antibiotic therapy was continued under consultant supervision and further management, including subsequent treatment modifications and concomitant medications, is summarized in Table 1.

The case was reported to the prosecutor's office.

Noted maculopapular rash on the limbs and trunk, eyelid swelling, and significantly elevated inflammatory markers: ESR, CRP, PCT, and ferritin. Blood tests revealed anemia, lymphopenia, hyponatremia, and increased levels of pro-BNP, LDH, transaminases (AST > ALT), triglycerides, and low albumin. Previously, fibrinogen and D-dimer levels had also been elevated. Additionally, SARS-CoV-2 IgM was positive, CMV PCR was positive, and the Quantiferon test was indeterminate. Given a persistent fever lasting over two weeks, markedly elevated inflammatory parameters, hematological abnormalities, a rash, signs of coagulopathy, and positive SARS-CoV-2 IgM, the differential diagnosis included PIMS-TS and systemic-onset juvenile idiopathic arthritis (soJIA), with a possible complication of macrophage activation syndrome (MAS). Further diagnostics and treatment were planned after central venous line placement, with a bone marrow biopsy scheduled for July 14, 2021, which did not reveal any leukemia or other hematological disorders.

As a consequence of this consultation, the patient was transferred to the Rheumatology Clinic, where she continued to receive treatment in accordance with current guidelines for systemic-onset JIA.

DISCUSSION

In this case, a 3-year-old girl with a complex medical history, including congenital cytomegalovirus infection and cerebral palsy, was admitted with symptoms of fever, thigh pain, and difficulty walking. Initially, common pediatric causes like transient synovitis were considered, but the fever and elevated inflammatory parameters suggested septic arthritis. However, despite arthrotomy and an antibiotic course, the lack of clinical response to typical treatment and rising inflammatory markers prompted further investigation. The diagnosis was revised when *Neisseria gonorrhoeae* was detected in joint fluid samples and later confirmed through molecular testing, which identified the pathogen's genetic material. Due to the sexually transmitted nature of the infection, the attending physician notified law enforcement and child protection authorities, as well as the child's caregivers, in accordance with legal requirements.

A gynecological exam was also conducted. Vaginal swabs were taken, and no trauma or abnormalities were observed; the hymen was intact and there were no visible signs of injury. Although these findings did not confirm sexual abuse, the presence of gonorrhea in a child this age required formal reporting and further evaluation [15, 16].

The patient was transferred to the Pediatric Pulmonology and Rheumatology Clinic of USD in Lublin with a diagnosis of M00.8 – "Other Bacterial Joint Infections." Persistent fever, cytopenias, coagulopathy, transaminasemia, high ferritin levels, and systemic inflammation complicated her hospital course. These findings led to the diagnosis of systemic-onset

juvenile idiopathic arthritis (SoJIA), complicated by macrophage activation syndrome (MAS) [17, 18]. The patient's history of cerebral palsy and congenital CMV infection, in combination with bacterial arthritis and recent SARS-CoV-2 IgM seropositivity, may have contributed to immune dysregulation and the development of MAS.

MAS is a life-threatening, hyperinflammatory syndrome resulting from excessive activation of macrophages and T lymphocytes. It is a known complication of SoJIA and often triggered by infections or immune stressors [19]. The patient required prolonged immunosuppressive therapy and close monitoring due to symptom recurrence and persistent inflammation, especially involving the hip joints.

This case highlights the diagnostic complexity of joint pain in children, which may include infections, inflammatory diseases such as JIA, and benign conditions such as growing pains [20, 21]. It underscores the necessity of a comprehensive, multidisciplinary approach in pediatric care, particularly in the context of increasing rates of sexually transmitted infections and expanding recognition of pediatric autoimmune conditions [22,23]. It is also important to note that gonococcal infections—though typically sexually transmitted—can rarely be seen in young individuals without a history of sexual activity. For example, an 18-year-old female with polyarticular arthritis tested positive for N. gonorrhoeae despite denying sexual contact, highlighting the importance of thorough and unbiased diagnostic workups in atypical presentations [24]. The recent rise in gonorrhea cases across Europe, including among vulnerable populations such as young children, emphasizes the need for vigilance and strict diagnostic standards in pediatric settings [25].

The course of her treatment underscores the challenges in managing patients with multifaceted conditions and the importance of coordinated care across specialties to address the evolving clinical picture. This case illustrates the intricate interplay between orthopedic and rheumatologic conditions and the critical need for ongoing, specialized care to manage both the primary disease and its complications effectively.

CONCLUSIONS

This case highlights the vital need for a vigilant, multidisciplinary approach to pediatric care, especially when dealing with complex presentations that challenge initial diagnostic assumptions. The unexpected diagnosis of gonococcal arthritis in a young child stresses the importance of considering a broad differential diagnosis, even for rare and atypical conditions. Additionally, the legal and protective measures implemented in response to potential abuse emphasize the intersection of medical and social responsibilities in pediatric practice. The subsequent management of systemic-onset juvenile idiopathic arthritis (SoJIA) with related complications further underscores the need for coordinated, continuous care across multiple specialties. This case not only demonstrates the complexity of diagnosing joint pain in children but also calls for greater awareness and improved diagnostic protocols to better address the rising incidence of sexually transmitted infections and autoimmune diseases in this vulnerable population.

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CONFLICT OF INTEREST

The Authors declare no conflict of interest

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