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Case report

Masked mastoiditis presenting with isolated motor tics in a pediatric patient: A case report

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ABSTRACT

Masked mastoiditis (MM) is a rare and diagnostically challenging condition characterized by inflammation of the mastoid air-cell system with minimal or absent otologic symptoms. Neurological manifestations are uncommon and typically associated with intracranial complications. We report the case of a 4-year-old boy presenting with a 6-day history of progressively worsening isolated motor tics, including head extension, frequent blinking, and repetitive squatting movements. There were no signs of infection, and otoscopic examination was unremarkable. Laboratory findings were within normal limits. Computed tomography revealed inflammatory changes within the mastoid process with bony erosion, while magnetic resonance imaging demonstrated a petrous pyramid abscess, meningeal irritation, and suspected sigmoid sinus thrombosis. The patient was treated with intravenous antibiotics followed by mastoidectomy. Postoperatively, the motor tics resolved completely, and no recurrence was observed during 15 months of follow-up. Masked mastoiditis in pediatric patients may present with highly atypical and non-specific symptoms, including isolated neurological manifestations. This case highlights that normal otoscopic findings do not exclude significant underlying mastoid pathology. Imaging studies, particularly CT and MRI, are essential for accurate diagnosis. Clinicians should maintain a high index of suspicion in children presenting with unexplained movement disorders. Early recognition and appropriate surgical intervention can lead to complete resolution of symptoms and prevent potentially life-threatening complications.

KEYWORDS

mastoiditis latens, mastoiditis latent, masked mastoiditis, children, otitis, case report

INTRODUCTION

Masked mastoiditis (MM), also known as latent mastoiditis, is a rare purulent inflammatory process that involves the air cells of the temporal bone and affects both the bony structures and mucosal lining [1,2]. A defining characteristic of MM is the absence of overt clinical manifestations, with minimal or absent symptoms. The duration of the condition can vary widely, persisting from weeks to years until either resolution or the onset of clinical complications [2].

Mastoiditis, as a broader clinical entity, is described in the literature as a typical intratemporal consequence of otitis media, it occurs in approximately 0.004% of otitis media cases, with an estimated incidence of 1.2–6.1 cases per 100,000 children per year [3]. It is associated with a risk of numerous further complications. Subperiosteal abscess is considered one of the most frequent, however, other common extracranial complications may occur, including facial nerve palsy, petrositis, and labyrinthitis [4]. Intracranial complications include meningitis, epi- or subdural

abscess, brain abscess, and venous sinus thrombosis. Bezold's abscess represents cervical complications [1,4,5]. Literature describes the initial stage of the disease as otitis media, with inflammation extending through the aditus of the antrum, which serves as the entrance to the mastoid cavity [6]. Streptococcus pneumoniae is regarded as the leading pathogen, Haemophilus influenzae, Streptococcus pyogenes, Staphylococcus aureus, and Pseudomonas aeruginosa have also been reported as pathogens to be considered as a cause in a diagnostic procedure [7]. Neurological manifestations associated with masked mastoiditis are uncommon and typically result from intracranial extension or irritation of adjacent neurovascular structures. Reported symptoms most often include headache, cranial nerve palsies, seizures, or altered consciousness [2]. A literature search of PubMed, ScienceDirect, and Embase via Ovid, using combinations of the terms "masked mastoiditis," "latent mastoiditis," "motor tics," "movement disorders," and "children" identified no previously reported cases of isolated motor tics associated with masked mastoiditis. To our knowledge, this is the first reported case of this presentation.

Motor tics in children are usually benign, transient, and idiopathic, and are frequently associated with developmental or neuropsychiatric conditions. They are rarely considered as manifestations of underlying infectious or inflammatory processes of the temporal bone.

In this case report, we present a rare, atypical manifestation of MM in a pediatric patient, presented as progressively worsening tics movements without any typical ear-related or systemic symptoms.

This case report has been reported in line with the SCARE Criteria [8].

CASE REPORT

We report a case of a 4-year-old boy who was urgently admitted to the Emergency Department due to progressively worsening motor tics for the last 6 days. The parents reported that the child had been pulling his head back, and blinking frequently. While walking, the child repeatedly bent his knees and squatted. There were no signs of an acute upper respiratory tract infection. The patient has been under the continuous care of an ear-nose-throat (ENT) specialist due to hypertrophy of the adenoids and tonsils, and was awaiting surgical treatment. There were no episodes of acute otitis media in the patient's medical history, although he experienced untreated earache in the second year of life. Laboratory tests of inflammatory markers were negative, and the complete blood count was within normal limits. The patient underwent a neurological consultation, and the examination revealed no other abnormalities. During the otolaryngology consultation, otoscopic examination demonstrated pale tympanic membranes with intact light reflexes bilaterally. Head computed tomography (CT) revealed a non-pneumatized right mastoid process (Figure 1). The mastoid cells contained inflammatory masses, accompanied by segmental

osteolysis of the walls and evidence of fusion. Aeration of the tympanic cavity was preserved. A linear mural defect was identified in the right sigmoid sinus, which appeared developmentally hypoplastic. There was suspicion of a trace thrombus. No pathological enhancement was observed within the intracranial structures following intravenous contrast administration. The patient was transferred to the Otolaryngology Department for further diagnostic evaluation and hospitalization. Magnetic resonance imaging (MRI) of the head and MRI angiography revealed no pathological enhancement within the brain. However, contrast enhancement at the level of the pia mater sulci was detected, indicating possible inflammation or irritation of the meninges. Exudative and inflammatory changes were identified within the pyramid of the right temporal bone (Figures 2 and 3). Marked developmental asymmetry of the posterior fossa venous sinuses was observed, with left-sided dominance. Anterior to the central segment of the right sigmoid sinus, a band-like lesion with heterogeneous peripheral enhancement was identified. This lesion measured approximately 12 × 8 × 8 mm, exhibited restricted diffusion, and extended anteriorly toward the sigmoid sinus and posterior fossa. These imaging findings are highly suggestive of an abscess in the posterior portion of the petrous pyramid. Within the right jugular vein and the lateral segment of the right sigmoid sinus, discrete bands of contrast loss and signal loss on the angiovenous sequence were observed, raising suspicion for mural thrombi. The patient was treated with intravenous amoxicillin-clavulanate antibiotic (55 mg/kg every 8 hours). Myringotomy was carried out, no pathological findings were observed in the right tympanic cavity. A tympanostomy tube (1.15 mm) was inserted. Mastoidectomy on the right side was performed. The mastoid cells were filled with inflammatory granulation tissue and a sloughy discharge. The narrow aditus was widened. The patient had an uneventful postoperative recovery. Intravenous antibiotic therapy was continued for a total period of 14 days. After 10 days of hospitalization postoperatively, the patient was discharged home. Following surgical treatment, the motor tics resolved completely, and the patient remains asymptomatic during 15 months of follow-up. The chronology of diagnostic procedures and treatment is presented in Table I.

Table I. Timeline summarizing the diagnostic process, treatment, and follow-up

Time point	Clinical course, diagnostic procedures, and treatment
Prior to admission	Progressive onset of motor tics, including head extension, frequent blinking, knee bending, and repetitive squatting. No otologic or systemic symptoms were present.
Day 0	Emergency Department admission. Head CT (inflammatory opacification of the right mastoid air cells with segmental bony). Neurological and otoscopic examinations. Laboratory investigations

Day 1	The Otolaryngology Department admission. MRI and MR angiography (abscess in the posterior petrous apex, meningeal irritation, mural thrombosis of the right sigmoid sinus) Intravenous amoxicillin–clavulanate therapy was initiated.
Day 2	Ear surgery (right myringotomy with tympanostomy tube insertion and mastoidectomy)
Postoperative period	Motor tics resolved completely. Intravenous antibiotic treatment was continued
Postoperative day 10	The patient was discharged home in good clinical condition.
15-month follow-up	The child remained asymptomatic, with no recurrence of motor tics.

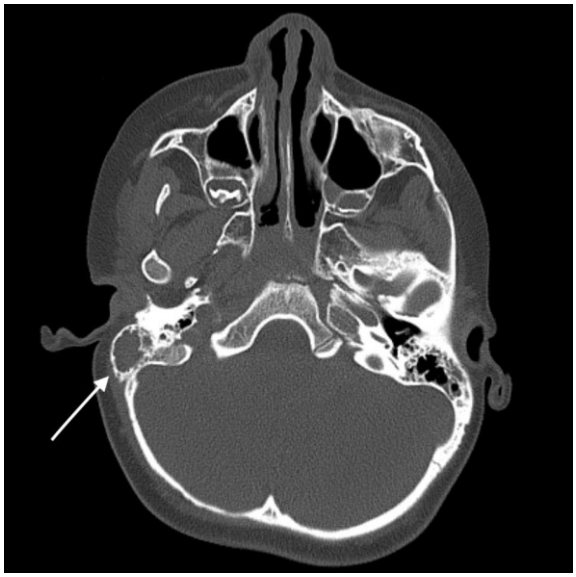

Fig. 1. Contrast-enhanced CT (axial bone window) demonstrating complete opacification of the right mastoid air-cell system with loss of normal pneumatization. The white arrow indicates inflammatory soft-tissue filling associated with segmental osteolysis of the mastoid cortex.

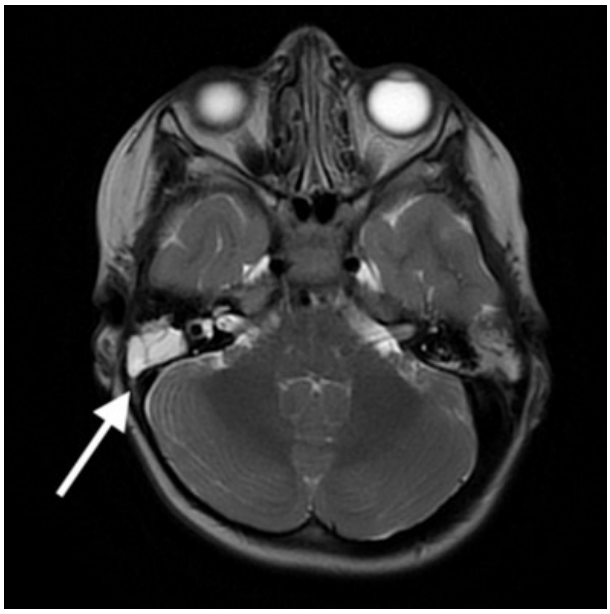

Fig. 2. Axial MRI of the head demonstrating extensive inflammatory changes involving the right mastoid and petrous temporal bone (white arrow), with fluid signal replacing the normal aerated mastoid air cells. These findings are consistent with masked mastoiditis and associated petrous bone involvement.

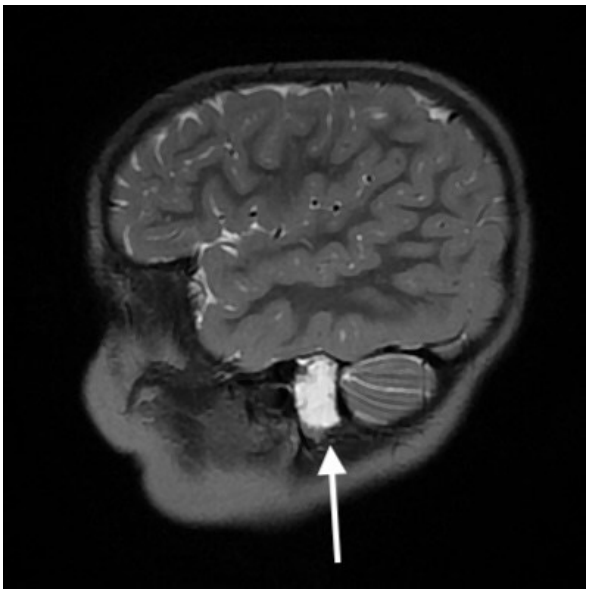

Fig. 3. Sagittal, contrast-enhanced MRI demonstrating inflammatory involvement of the right mastoid and petrous temporal bone (white arrow).

DISCUSSION

MM is a rare disorder defined by inflammation of the temporal bone structures and is generally regarded as a chronic or subacute variant of mastoiditis [9]. In contrast to acute mastoiditis,

characteristic symptoms typically appear shortly after the onset of otitis media. These include increased temperature and inflammatory markers, recurrent otalgia, purulent otorrhea, or swelling, redness, and tenderness of the mastoid process on palpation [10,11]. In this 4-year-old boy, the clinical picture was dominated by recurrent motor tics over 6 days, with no prior or current symptoms suggesting an ongoing inflammatory process in the middle ear. The literature indicates that otoscopic examination generally does not reveal alarming symptoms; typically, only thickening of the tympanic membrane is observed [9,12,13]. In these cases, neurological manifestations may predominate over the classic symptoms of ear infection, although both may be present simultaneously. Regarding neurological manifestations associated with mastoid-related complications, Chen et al. [14] reported facial nerve palsy in a 3-month-old infant with masked mastoiditis. Similarly, Voudouris et al. [2] described an 8-year-old girl presenting with headache and neurological symptoms, including vertigo, disturbances of consciousness, and speech disorders. The sudden onset of neurological manifestations following recent otitis media should prompt consideration of intracranial complications. In both reported cases, a preceding episode of acute otitis media was noted, which was not observed in the present patient. The underlying pathophysiology involves otitis media, which does not invariably produce severe otologic symptoms. Another factor predisposing to the development of MM is a blocked aditus ad antrum [13]. In our case, during surgery, the narrow aditus was widened to prevent recurrence of inflammation in this location. Additionally, risk groups such as newborns, immunosuppressed patients, diabetics, and the elderly are given special attention [12,15]. Due to the limited information obtained from otoscopic examination and only the presence of neurological symptoms, imaging studies were crucial for obtaining the appropriate diagnosis. CT demonstrated a lack of mastoid pneumatization and inflammatory changes with bony destruction, findings consistent with an inflammatory process involving the mastoid. Similar imaging descriptions suggest inflammation of the mastoid [16]. An MRI scan was performed to confirm the suspicion of cerebral venous sinus thrombosis [17]. MRI is preferred for comprehensive evaluation of potential intracranial complications [18]. The mechanism linking masked mastoiditis with isolated motor tics remains uncertain. Several pathophysiological mechanisms may explain this unusual presentation. First, inflammation extending to the petrous temporal bone and adjacent meninges may induce focal irritation of nearby neural structures. Second, inflammatory mediators and cytokines released during infection may transiently interfere with normal neuronal signaling, potentially contributing to the development of motor tics. Finally, the radiological findings of meningeal irritation and suspected sigmoid sinus involvement in our patient may have contributed to subtle disturbances of regional cerebral function despite the absence of focal neurological deficits.

Although these mechanisms remain hypothetical, the complete resolution of motor tics following mastoidectomy and antibiotic therapy suggests a causal relationship between the underlying inflammatory process and the movement disorder.

Evidence from both institutional experience and the literature indicates that targeted intravenous antibiotics are considered first-line treatment when the pathogen is identified, while broad-spectrum antibiotics are recommended in other cases. Mastoidectomy is indicated if there is no clinical improvement within 72 hours of conservative management or if intracranial complications develop [19].

CONCLUSIONS

Masked mastoiditis in pediatric patients may present with highly atypical and non-specific symptoms, including isolated neurological manifestations. This case highlights that normal otoscopic findings do not exclude significant underlying mastoid pathology. Imaging studies, particularly CT and MRI, are essential for accurate diagnosis. Clinicians should maintain a high index of suspicion in children presenting with unexplained movement disorders. Early recognition and appropriate surgical intervention can lead to complete resolution of symptoms and prevent potentially life-threatening complications.

Informed consent statement

Written informed consent was obtained from the patient's legal guardians for publication of this case report and accompanying clinical information.

Authors' contribution

Study design – A. Gierlotka, I. Bielecki

Manuscript preparation – W. Nowicka, P. Włodarczyk, B. Ziaja, A. Gierlotka, I. Bielecki

Literature research – W. Nowicka, P. Włodarczyk, B. Ziaja

Final approval of the version to be published – W. Nowicka, P. Włodarczyk, B. Ziaja, A. Gierlotka, I. Bielecki

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