Case Report

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# Acute Mastoiditis in a Child with a History of Cochlear Implantation: a Case Report

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## Abstract

**Background:** Acute mastoiditis is one of the complications of acute otitis media in children. Patients with acute mastoiditis commonly have manifestations of acute otitis media and inflammation of the mastoid bone. Computed tomography is the most frequent diagnostic method for diagnosing acute mastoiditis. In this report, we presented a 6-year-old boy with a history of cochlear implantation three years ago, who was referred for acute swelling and pain in the mastoid bone one day ago.

**Case presentation:** A 6-year-old boy with fever, pain, redness, and swelling of the posterior side of his right ear from one day ago was referred to the clinic. Physical examination showed tenderness, redness, warmness, and swelling on the right auricle and mastoid bone. Implantation in the right ear about three years ago was mentioned. Last week, involvement with coryza, nasal congestion, and low-grade fever without ear pain was mentioned. Acute mastoiditis was confirmed with CT scanning, and he was cured with antibiotic therapy.

**Discussion:** Acute mastoiditis is not common. It may occur after a few times of cochlear implantation, but it occurs rarely after a long time. The main cause is bacterial infection. After confirmation of the diagnosis with CT scanning, treatment with antibiotics should be started intravenously, and then it can be changed to oral antibiotics.

**Conclusion:** Acute mastoiditis should be considered as a differential diagnosis in pediatrics with acute swelling, pain, and any manifestation of inflammation on mastoid bone, even though there is no history of acute otitis media.

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## Introduction

Acute mastoiditis is a mastoid bone infection due to bacterial infection. The illness needs to be correctly defined. Mastoid bone involvement in acute otitis media infectious is very common because mastoid bone is in proximity of infected region(1). Acute mastoiditis is a severe complication of otitis media and its prevalence is 1 in 400 cases (0.24%). The incidence rate is about 1.2 to 6.1 per 100,000 per year in children younger than 14 years (2, 3).

The diagnosis of mastoiditis should be done clinically. Besides, Laboratory and imaging studies are helpful to confirmation of the presence of mastoiditis. Routine laboratory studies including a CBC, ESR, and CRP are the most common laboratory test that should be done in these patients. CT scan is the main imaging study and can show a disruption of

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the bony septation and fulfilling of the mastoid air cells with infection (1, 4).

Although acute mastoiditis is not common, uncomplicated acute mastoiditis can be diagnosed based on a clinical assessment. In very young children with manifestations of acute otitis media and high-grade fever, acute mastoiditis can be diagnosed easily; if there are presentations of mastoid bone inflammation including redness, tenderness, and swelling (5-8).

In this report, we presented a six-years-old boy with a history of upper respiratory tract infection such as coryza, low grade fever, and very short time presentation of mastoiditis.

## Case presentation

A 6-years-old boy was referred to pediatric clinic of the Loghman Hakim hospital (Tehran-Iran) with complaints of pain, redness, and swelling of posterior side of right ear. He also had fever. These manifestations occurred one day ago. There were tenderness, redness, warmness, and swelling on right auricle and mastoid bone in physical examination. Implantation in the right ear about three years ago was mentioned in past medical history. He also experienced coryza, nasal congestion, and low-grade fever without ear pain during last week.

He was admitted with the diagnosis of acute mastoiditis on laboratory studies, leukocytosis (white blood cell=16500/ml, 77% PMN), high levels of ESR (95 mm/hr) and CRP (81 mg/dL) were founded.

Moreover, on temporal bone CT scans with intravenous contrast, consolidation in the right mastoid air cells was observed.

With confirmation of acute mastoiditis diagnosis, intravenous (IV) antibiotics were administered for the patient including vancomycin and meropenem. After 48 hours, the signs and symptoms were resolved and IV antibiotics were continued for 6 days.

After this duration, the laboratory findings were as following: ESR=12 and CRP=8mg/dL. Based on clinical condition and laboratory results, antibiotics were changed to oral form (syrup of Co-amoxiclav 643 (farmentin ©) was prescribed as 7.5cc BD for) and the patient was discharged with a good condition.

After 10 days, he was referred for follow up and there was no complaint. It is recommended to continue the oral antibiotic with the same dose for one month and then refer for follow-up.

## Discussion

Although acute mastoiditis is a complication of acute otitis media, it is not common. In fact, acute mastoiditis is a rare presentation of mastoid involvement due to acute otitis media. (9-11).

Mastoiditis after three years of cochlear implantation is very rare. In a study, it was found that during 12 years of follow-ups of 12 patients with cochlear implantation, there was no presentation of mastoiditis and the only complication of cochlear implantation was a breakdown of external auditory canal closure (12). In a study, it was mentioned that among 490 ears that were cochlear implanted, 3.5% had acute mastoiditis and the duration of implantation to mastoiditis was 5-61 months (13). These findings show the rarity of mastoiditis presentation after a long time of cochlear implantation.

Bacterial infection is the most cause of acute mastoiditis. This type of infection spreads from middle ear infection to mastoid air cells. However, sometimes samples are negative for bacterial infection and it is mentioned that it could be due to early antibiotic prescription before obtaining culture (14, 15). In our case, the presentation of mastoid involvement that was included as mastoid abscess was developed during one day and the patient didn't show any signs and symptoms of otitis media. He only had coryza signs. Of the interesting issues of our case was that there were no manifestation of otitis media and he

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showed mastoid abscess during 24 hours. It seems that our case manifestations occurred due to external device that was implanted for cochlear implant because there were no other related causes for mastoiditis in him.

Leukocytosis, elevated ESR and CRP are the most common laboratory findings in patients with acute mastoiditis (16). Elevated ESR, CRP, and leukocytosis were observed in our patient. After treatment, decreasing trend of ESR and CRP were markers for response to the treatment. (17).

It is recommended that performing at least a CT scan for patients who are suspected to acute mastoiditis, can increase the rate of diagnosis, especially in patients who had no prominent manifestation of acute mastoiditis (5). Although CT scan is a helpful method for the diagnosis of acute mastoiditis, physicians should consider that this method can increase the risk of cancer and only use it in pediatric with suspected acute mastoiditis (18). The findings of acute mastoiditis in CT scan are as following: mastoid and middle ear mucosal and/or fluid thickening, loss of definition of mastoid air cells, destruction of the irregularity of the cortex of mastoid, and presentation of abscess in subperiosteum or periosteum(1).

The main treatment method for acute uncomplicated mastoiditis is intravenous antibiotic therapy. Vancomycin and third generation cephalosporins are the most common empiric intravenous antibiotics that are prescribed for the treatment of mastoiditis (19, 20). Also, the treatment with other antibiotic like amoxicillin-clavulanate is effective for the management of acute mastoiditis. It should be noted that oral amoxicillin-clavulanate should be continued at least for 10 days after recovery to prevent long-term sequelae or recurrences of acute mastoiditis (15, 20, 21).

## Conclusion

It is concluded that acute mastoiditis should be considered as a differential diagnosis in pediatric with acute swelling, pain, and any manifestation of inflammation on mastoid bone, even though there is no history of acute otitis media. Physicians should be aware about these manifestations in patients who have a history of cochlear implantation. CT scan should be done in these patients and IV and oral antibiotic should be administered.

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