A Case Report of Bilateral Sensorineural Hearing Loss in Pediatric Tubulointerstitial Nephritis and Uveitis (TINU)-Atypical Cogan Syndrome.

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Abstract

Background: Tubulointerstitial nephritis and uveitis (TINU) syndrome is a rare, multisystem autoimmune disorder that causes inflammation of the uvea and renal tubules. Cogan’s syndrome is an autoimmune condition that classically presents with interstitial keratitis as well as auditory and vestibular dysfunction. Overlap of the two syndromes have been previously described. Hence, we describe a pediatric case of TINU and atypical Cogan’s with hearing loss.

Methods: Case report and literature review

Results: The patient was a 14-year-old male of Palestinian ancestry. He initially presented with abdominal pain, elevated CRP, and acute renal failure. A kidney biopsy revealed interstitial nephritis and he was started on prednisone. Prednisone was tapered off when nephritis improved, but several months later the patient reported decreased visual acuity and was diagnosed with uveitis. Subsequently, the patient noted hearing loss and was diagnosed with profound, bilateral sensorineural hearing loss refractory to medical therapy. While the patient denied vestibular symptoms, videonystagmography confirmed vestibular weakness in the right ear. The patient was diagnosed at a tertiary care center and treated with pulse dose methylprednisolone, infliximab, and methotrexate. The patient subsequently underwent cochlear implantation on the right to address his hearing loss.

Conclusions: This is the second documented case of hearing loss seen in TINU and atypical Cogan’s. This case highlights the challenges of multisystem disease process and importance of providing multidisciplinary care. This case also showcases the importance of considering autoimmune causes of hearing loss in pediatric patients which require additional investigations and immunosuppressive therapy.

Introduction

Tubulointerstitial nephritis and uveitis (TINU) syndrome is a multisystem autoimmune disorder characterized by inflammation in the uvea and renal tubules².

Cogan syndrome (CS) is classified primarily as a variable vessel vasculitis disease with potential systemic involvement². Cogan’s is typically characterized by ocular and vestibulocaudatory symptoms².

Although both syndromes can occur at any age, both seem to frequently affect young adults and adolescents¹. The diagnosis of TINU is based on the presence and combination of uveitis and renal involvement with renal biopsy consistent with acute interstitial nephritis. The diagnosis of CS is based upon the presence of inflammatory eye disease and vestibulocaudatory dysfunction. Table 1 demonstrates possible differential diagnoses with non-infectious inflammatory eye disease and acquired sensorineural hearing loss.

Methods and Materials

A relevant case of atypical TINU-Cogan Syndrome is presented. A literature search was conducted for peer-reviewed publications using the online search database PubMed on April 16, 2022. Search terms included: Cogan Syndrome, TINU, and atypical Cogan Syndrome in various combinations. Search results were limited to the English language. There were no restrictions for the year of publication, and additional articles were included following review of the reference list.

Methods

Figure 1A: Patient audiogram demonstrating bilateral sensorineural hearing loss, profound in the right ear

Figure 1B: Patient audiogram demonstrating right cochlear implant initial post activation thresholds

Results

Case Presentation

In this case report, the patient is a 14 year old male of Palestinian ancestry. He initially presented on March 9, 2021 with right lower quadrant abdominal pain. Investigations showed elevated C-reactive protein (CRP) of 107mg/L, elevated creatinine of 150µM/L, normal urea of 3.4 mmol/L, and no hematuria or proteinuria. Subsequent kidney biopsy revealed interstitial inflammation. He was started on oral prednisone treatment and was responding well until he reported new onset of visual and auditory symptoms. He had evidence of uveitis and significant hearing loss in the right ear. Videonystagmography showed marked vestibular weakness on the right side but normal responses on the left side. He was started on infliximab, methotrexate, and folic acid as part of his medical treatment. Workup for toxoplasmosis, hepatitis, cat scratch fever, Lyme disease, syphilis, legionella, pneumocystis carinii, mycoplasma, viral and fungal infections were all negative. Genetic panel testing was also negative. Due to left severe and right profound hearing loss refractory to medical therapy, he underwent a cochlear implant procedure for his right ear. The right cochlear implant was successful and the average implant thresholds were 30 decibels. There is the potential for left ear implant if his hearing deteriorates further despite biological medical treatment.

Literature review

A total of one article was published about atypical Cogan Syndrome with TINU. The case report presented similar symptoms of tubulointerstitial nephritis, uveitis, and vestibular failure requiring cochlear implantation². High-dose corticosteroids (1mg/kg/day IV) has been shown to improve the odds of recovering hearing loss when given within 2 weeks of initial auditory symptom¹. When steroids are not effective, intolerance of, contraindications occur, DMARD therapy has been used as adjunct therapy³. Infliximab has been shown to have a 80% response rate in patients with CS and failed response of steroid and DMARD combination therapy⁴.

Table 1. Differential for non-infectious inflammatory eye disease with acquired sensorineural hearing loss, modified from Brogan et al. 2012

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>PAN</th>
<th>Cogan’s Syndrome</th>
<th>SLE ± APS</th>
<th>Primary APS</th>
<th>Relapsing polychondritis</th>
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<tr>
<td>Systemic Vasculitides and Autoimmune diseases</td>
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<td>ANCA-associated vasculitides (GPA)</td>
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<td>Kawasaki Disease</td>
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<td>Ectopic thymus</td>
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<td>SS ± APS</td>
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<td>IBG</td>
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<td>Autoimmune inflammatory arthritides</td>
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<td>Auto-inflammatory disorders</td>
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<td>Sacroiliitis</td>
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<td>Cryopyrin-associated periodic fever syndromes</td>
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<td>Miscellaneous Causes</td>
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<tr>
<td>TINU syndromes</td>
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<td>Mitochondrial cytopathies</td>
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<td>Susan’s syndrome (retinocochlear vasculopathy)</td>
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Legend: granulomatosis with polyangiitis (GPA), polyarteritis nodosa (PAN), Sjögren’s syndrome (SS), antiphospholipid syndrome (APS), systemic lupus erythematosus (SLE), inflammatory bowel disease (IBD)

Discussion

• This unusual presentation of atypical Cogan’s syndrome with element of TINU is the second reported case
• Renal biopsy demonstrated acute interstitial nephritis and videonystagmography showed marked vestibular weakness on the right side and normal responses on the left side
• At the time of write up, the patient received right cochlear implant and ongoing monitoring for his left sided hearing loss as well and on Infliximab every 8 weeks
• This case is the second of its kind reported in literature and highlights the complexity of symptomology of these multisystem diseases and the importance of timely treatment to prevent irreversible hearing loss

Conclusions

This case highlights the challenges of multisystem disease process and importance of providing multidisciplinary care. This case also showcases the importance of considering autoimmune causes of hearing loss in pediatric patients which require additional investigations and immunosuppressive therapy.

References

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