Opioid-Associated Bilateral Sudden Sensorineural Hearing Loss: A Case Report and Literature Review

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Abstract

Objectives: Opioid drug abuse is increasing, particularly among young adults. A devastating, less commonly described complication of opioid abuse is bilateral sudden sensorineural hearing loss (SSNHL). Our objectives are to describe a case of opioid-associated SSNHL, review the literature, and delineate potential mechanisms of action.

Study Design: Case report and literature review

Methods: Review case of a 27-year-old who suffered bilateral SSNHL after a heroin overdose. A PUBMED literature search was performed using the key words hearing loss, opioids, and heroin to identify related articles.

Results: After a heroin overdose, the patient was admitted with multi-organ failure and anoxic brain injury. Once stabilized, he immediately endorsed bilateral hearing loss. He was treated empirically with an oral high-dose steroid taper followed by an outpatient audiogram one month later demonstrating bilateral moderate SNHL. He opted for salvage therapy with intratympanic steroid injections without subjective improvement. Although the exact mechanism of injury is unknown, hypoperfusion to the cochlea seems probable. In the absence of hyperperfusion, opioids also have direct effects on inner ear opioid receptors, which can lead to ototoxic effects. Of reported cases in the literature, hearing loss often occurred during a relapse in chronic opioid abusers, and most cases failed to fully recover their hearing.

Conclusions: Bilateral SSNHL can result from opioid abuse with young adults being most at risk. The mechanism of action for opioid-associated hearing loss is likely multifactorial with potential factors including cochlear toxicity, hypoperfusion from drug-induced vasospasm, and cerebral infarction from systemic hypotension.

Case Report

27-year-old male brought to emergency department by EMS unresponsive after heroin overdose

Required intubation and pressor support in the ICU for multi-organ failure with brain imaging findings of hypoxic ischemia

After extubation endorsed significant bilateral hearing loss with no associated otologic or vestibular symptoms or relevant exam findings

Treated empirically with high-dose oral steroid taper for 16 days

Presented to outpatient Otolaryngology clinic one month after incident with persistent hearing loss and audiogram results below (Fig. 2)

Salvage intratympanic steroid injection performed without improvement

Offered hearing aids for amplification, but was lost to follow-up

Introduction:

- Per the CDC, the number of opioid-associated deaths has more than tripled from 1999 to 20151 (Fig. 1)
- Heroin epidemic has been compared to the AIDS epidemic of the 1990s
- Public health crisis of limiting opioid prescriptions to decrease supply, but now illegally manufactured synthetic opioids are on the rise2
- Bilateral sudden sensorineural hearing loss (SSNHL) is a rare but debilitating side effect of opioid abuse/overdose
- Objectives:
  1. Describe a case of bilateral SSNHL after heroin overdose
  2. Review the literature on opioid-associated hearing loss

Literature Review

6 cases of bilateral SSNHL after heroin abuse or overdose have been described3,4

Several more cases have been tied to methadone, oxycodone, and hydrocodone-acetaminophen abuse5,6

Most cases occur in the setting of drug relapse after a period of abstinence

Cases vary from transient hearing loss with recovery to persistent hearing loss both with and without steroid treatment

Majority of cases respond well to rehabilitation with hearing aids or cochlear implantation, if necessary

Some possible mechanisms of action:
  - Cochlear toxicity from resensitization of opioid receptors found in the organ of Corti, spiral ganglion neurons, and efferent nerve fibers innervating hair cells
  - Hypoperfusion from opioid-induced vasospasm
  - Cerebral infarction from systemic hypotension

Conclusions

- Reported cases of opioid-associated SSNHL are widely variable in terms of hearing outcome
- Hearing rehabilitation with hearing aids and cochlear implantation has been successful in cases when hearing loss is persistent
- With the current opioid abuse landscape, it is important for practitioners to recognize the potential for hearing loss in opioid users
- Primary providers should consider early referral to Otolaryngology and Audiology for formal hearing testing, counseling, and follow-up

References