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A Study of Sudden Sensorineural Hearing Loss in Pregnancy

Vasim Ismail Patel[1], Bibi Zainab[2], Aparna Sethuraman[3*]

[1]Department of Obstetrics & Gynaecology, Navodaya Medical College, Raichur (Karnataka), India

[2]Department of Otolaryngology and Head & Neck Surgery, Navodaya Medical College, Raichur (Karnataka), India

[3]Corresponding author

Abstract: ***Background: Sudden deafness is defined as the rapid decline of hearing in at least 3 contiguous frequencies without any identifiable cause. The etiology of sudden deafness is difficult to determine and may include vascular, allergic, traumatic, inflammatory, degenerative oncologic, or genetic conditions. It is not very often to be seen in pregnant women. It is postulated that the sex hormone changes may increase thrombogenic risk and interrupt cochlear microcirculation, causing the development of sudden deafness. Methods: A total of 1250 pregnant women were screened in a time period of one year, only twenty cases of sudden sensorineural hearing loss (SSNHL) were noticed. Of which ten patients were observed without any intervention and ten patients underwent intervention with intratympanic corticosteroids. Patient response for treatment was evaluated. Written and informed consent was taken from all the patients involved in the study for further evaluation, treatment and publication of the study. Results: Intravenous with intratympanic corticosteroids is safe and effective therapeutic strategy for pregnant patients with SSNHL Although some patients have a tendency for self-cure. Further study is required to identify the best therapeutic strategy for these patients. Conclusion: Standard treatment for SSNHL in pregnancy consists of intratympanic administration of corticosteroids. Some patients recover completely without any medical intervention, often after birth of child, This is called a spontaneous recovery. Others get better slowly over 1-4 week period during pregnancy. Although a good to excellent recovery of hearing is likely.***

Keywords: Corticosteroids, Intratympanic injection, Pregnancy, SSNHL.

1. Introduction

Sudden sensorineural hearing loss (SSNHL) is an emergency, characterised by acute sensorineural hearing loss, unilateral rarely bilateral. Diagnostic of SSNHL is based on history (onset within three days) and pure tone audiometry, which certifies at least 30 dB loss of hearing over 3 consecutive frequencies[(1)]. Appropriate medical attitude includes prompt treatment and a complete workup in order to find the cause[(2)]. However, in most cases (75-80%) the exact cause cannot be identified and SSNHL is considered idiopathic, but it is considered that viral cochleitis, microvascular events or autoimmune disorders might be involved in pathogenesis of this disease[(3-4)]. Known etiology of SSNHL might be: a viral (Cytomegalovirus, Epstein-Barr virus, HIV) or bacterial (treponema pallidum) infection, head trauma, immunologic disease (Cogan syndrome), collagen vascular disorders (antip-hospholipid antibody syndrome, systemic lupus erythematous, Wegener granulomatosis)[(5,6)], toxic causes, ototoxic drugs (aminoglycoside antibiotics), circulatory problems.

Some patients recover completely without medical intervention, often within the first 3 days. This is called a spontaneous recovery. Others get better slowly over a 1 or 2-week period. Although a good to excellent recovery is likely, 15 percent of those with SSHL experience a hearing loss that gets worse over time.

2. Methods

A prospective study was done at our centre from January 2016 to December 2017 and a total of 1250 pregnant women were taken into study who complained about hearing loss after conceiving, only 20 meet with the criteria for the study of which 10 patients were observed without any intervention, with weekly Pure Tone Audiometry (PTA) for three consecutive weeks. A group of 10 patients were given intervention with intratympanic corticosteroids weekly once for three weeks and records were maintained for any change is PTA. Written and informed consent was taken from all the patients involved in the study for further evaluation treatment and publication of the study.

Inclusion criteria

1) Pregnant Patients aged between 18-37 years regardless of duration into pregnancy or trimester.
2) Sudden Bilateral/Unilateral sensorineural hearing lossin pregnancy with rapid (within 72 hours) decline of hearing (mean PTA of 30 dB hearing loss) in at least 3 contiguous frequencies without any identifiable cause.
3) Patients having good general physical condition.
4) Patients who agreed for the study and gave consent for intervention and monitoring.

Exclusion criteria

1) Patient more than 38 years of age
2) Patients with previous ear complaints like chronic otitis media mucosal type or squamosal type with attic perforation or cholesteatoma
3) Patient with prior conductive orsensorineural hearing loss.
4) Patient who have undergone any previous ear surgery.
5) Any pregnancy related condition like pregnancy induced hypertension (PIH) or Hyperemesis gravidarum.
6) Any pervious bad obstetrics history.

7) HbsAg and HIV positive patients and other chronic inflammatory diseases that would interfere with wound healing
8) Patients having potentially systemic causes of SSNHL including syphilis, Lyme disease, metabolic, autoimmune and circulatory disorders.
9) Hypertension, Diabetes mellitus, chronic cardiac illness and patients medically certified as High risk pregnancy.

3. Results

A total of 1250 pregnant women were taken into study who were fit for the criteria assigned for the study only 20 patients were eligible thus the prevalence of the condition is less than 1.2% making it a very rare presentation. Written and informed consent was taken from all the patients in their own language about their involvement in the study, treatment and use of data collected for publication and demonstration.

Table 1: Age Wise Distribution of Patients

S.No	Age Wise Distribution	No. of patients
1.	18-22 years	2
2.	23-27 years	5
3.	28-32years	7
4.	33-37years	6

Table 2: Bilateral/Unilateral Presentation

S.NO.	Laterality of the Involvedear	No. of patients
1.	Unilateral	14
2.	Bilateral	6

Table 3: Gestational Age of Patients

	1st trimester (0-12 weeks)	2nd trimester (13-28 weeks)	3rdtrimester (29-40weeks)
No. of patients involved	4	9	7

Table 4: Mean Value of Pure Tone Audiometry in Decibel

SL.NO	Mean PTA 1ST Visit	Mean PTA 2nd Visit (1 Week)	Mean PTA 3rd Visit (2 Week)	Mean PTA 4th Visit (3RD Week)
Patients Without Intervention	42dBHL	40dBHL	33dBHL	27dBHL
Patients With Intervention	41.6dBHL	32dBHL	26.4dBHL	18dBHL

4. Discussion

Sudden sensorineural hearing loss (SSNHL) in most cases is idiopathic but other common causes being hypercoagulopathy, infectious diseases, neurologic disorders, ototoxic agents, immunologic causes, trauma, and tumours(7). During pregnancy, electrolyte imbalance in intracellular and extracellular compartments, pregnancy related hormone fluctuations and activation of blood coagulation factors take place.

We performed a prospective study to asses SSNHL in pregnancy and how to treat it, a comparative study was performed on patients fitting the inclusion criteria for the study and half of them were treated with Intratympanic corticosteroid and another half were observed with regular weekly audiological evaluation.

In our study we were able to get only 20 patients fitting into criteria for the study among 1250 patients indicating that the prevalence of the condition is rare upto about 1.2% .(Table - 01)

The condition was more commonly seen in patients within age group of 28 to 32 years with 35% prevalence and rare in younger patient with 10% prevalence. The data was statistically insignificant indicating that SSNHL can be seen at age of pregnancy.(Table-01)

SSNHL was seen unilaterally in 13 patients effecting only on ear bilateral involvement is comparatively less. The fact gives us an Indication that a more local cause is reason for SSNHL in pregnancy then systemic cause.(Table-02)

The gestational age of most of the patient was in there early second trimester that is 3rd to 4th month of intrauterine life with 40% prevalence. (Table-03)

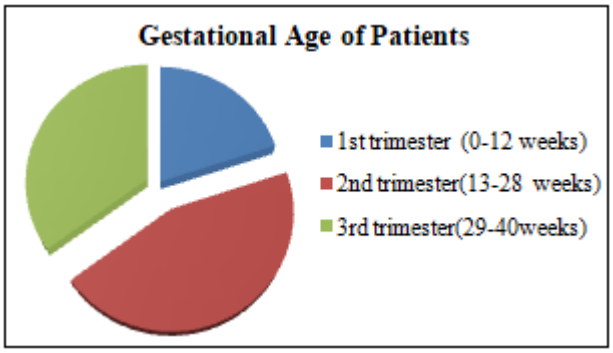

Chart 1: Gestational Age of Patients

Anatomically, the cochlea is supplied by the labyrinth artery. As a terminal artery, the labyrinth artery is vulnerable to vascular occlusion. Accordingly, most changes in the cardiovascular system and hematological system occur in the second month of pregnancy, and plateau in the second or third trimester.[8] There is usually a rise in some coagulation factors (VII, VIII, IX, X, XII) and fibrinogen, and a fall occurs in factor XI in pregnancy.[9] Therefore, a hypercoagulable state with increased activation of blood coagulation and the fibrinolysis system appears during normal pregnancy. However, these changes in the hypercoagulable state could increase plasma viscosity and erythrocyte aggregation, and decrease erythrocyte deformability in pregnant women. This may lead to an increase in the risk of thromboembolism in the labyrinth artery and vascular occlusion in the cochlear microcirculation,[8,9,10] and may further evoke SSNHL.

Systemic use of corticosteroids has been the gold standard in the treatment of SSNHL despite some contradictory proposals[11].Administration of systemic corticosteroids in pregnancy may have disastrous effect on foetal as well as maternal health Recently, local use of corticosteroids with intratympanic administration has been an option in SSNHL.. This methods avoids the adverse side effects of corticosteroids on fetus and its development, maternal – hormonal, renal gastrointestinal system, eyes, glucose metabolism, hepatic functions and cardiovascular system[12]. In addition, intratympanic administration may increase the

effectiveness of corticosteroids in the cochlea as the medication is directly absorbed from round window[13]. Decreased systemic toxicity and local applicability seem favorable features of the intratympanic corticosteroid treatment in pregnancy. Corticosteroids work via reduction of inflammation and the immune response, a change in the mircrovascular circulation, and a direct effect on sensory epithelium of the cochleae.

The mean Pure Tone Audiometry(PTA) of patient were done four times which included the first PTA at the time of presentation a usual of 41.8Dbhl was seen in patients of both groups at the time of presentation which slowly improved with time.

In patients with intervention the Intratympanic steroid Dexamethasone 2mg in 1ml was given in posteio-inferior quadrant of Tympanic membrane for three concetive weeks.

All the patients with intervention showed significant improvement in hearing from mean base line of 41.6dBHL to 32dBHL in the first week of intervention later coming upto a mean PTA of 18dBHL hearing gain of 23.6dBHL was seen. (Table-04)

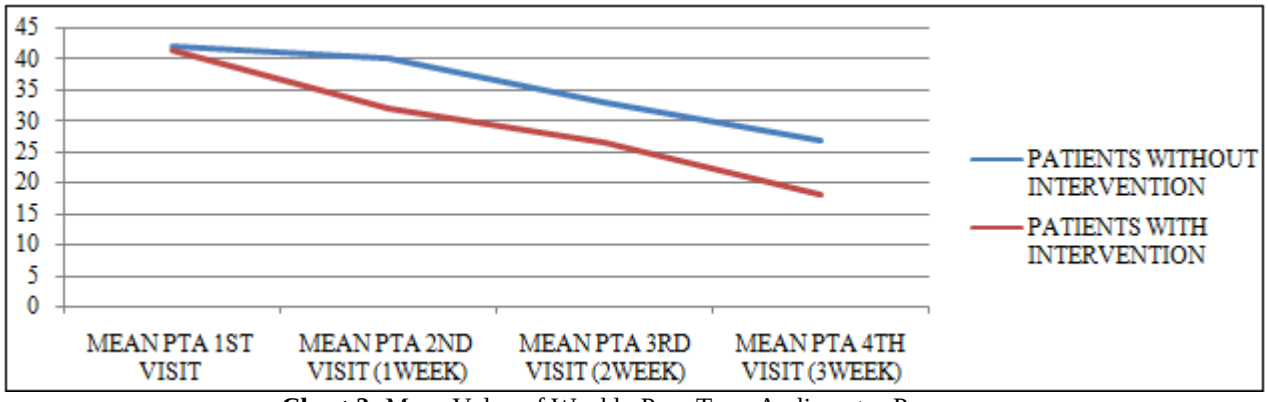

Chart 2: Mean Value of Weekly Pure Tone Audiometry Progress

In patients without any intervention the PTA values improved much slower than the patient with intervention they reached a mean PTA value of 27 dBHL by the end of fourth week maximum amount of improvement was seen in third week.

All patients in both the groups were followed up for one year. All had normal perinatal and postnatal condition with no complications in child birth or labour with healthy child.

The presenting symptom of our pregnant patient was SSNHL. Early Recognition and proper management of SSNHL in pregnant women is important because emotional status of the patients might impede upon pregnancy development. Appropriate audiological evaluation is mandatory in order to exclude tumoral etiology of SSNHL. Even though in majority of cases spontaneous recovery after delivery occurs, emergency treatment is mandatory due to ethical reasons.

5. Conclusion

Standard treatment for SSNHL consists of intratympanic administration of corticosteroids, other treatment modalities are also suggested like antiviral therapy, hyperbaric oxygen, and free-radical scavenging agents[16,17]. The status of pregnancy limits the mode of treatment to a considerable level. There are very few controlled treatment trials and response to therapy in them are difficult to evaluate[18]. Hearing improvement after delivery in majority of cases is suggestive of reversible inner ear process. Part of the SSHNL workup in pregnancy should include continued monitoring of the patient, early intervention and regular counselling.

6. Declarations

Funding: Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional guidelines on human experimentation and with Helsinki declaration of 1975, as revised in 2008.

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