

# A study of transient hearing loss after spinal anesthesia

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## Abstract

**Background:** Transient sensorineural hearing loss in the low frequencies can be observed after spinal anesthesia. Reported incidence rates of hearing loss after spinal anesthesia range between 0.2% and 8%. This rate can even be as high as 92% in some categories of high risk patients **Aims and Objective:** To study the transient hearing loss as a complication of spinal anesthesia. **Materials and Method:** In the present study patients were selected from the age group of 20 to 60 and having normal hearing power. Total 35 patients were enrolled in the present study. Preanesthetic examination was conducted among all the selected study patients. Detailed physical examination was also carried out and the findings were recorded in prestructured proforma. Audiometry was performed in all the patients before surgery. Repeat audiogram was taken on second and fifth day following surgery to record the hearing loss. **Results:** Majority of the patients (40%) were in the age group of 21-30 years followed by 31-40 years of age (25.71%). 60% patients were male and 40% were female. 88.57% patients were of ASA grade I and remaining 11.43% were of ASA grade II. 17.14% patients developed transient hearing loss. Majority of the patients (3 cases) were having hearing loss at 2000Hz. At 500Hz, 1000Hz and 4000Hz one case each was diagnosed. All the patients were followed for one month and it was observed that the hearing loss was completely reversed in one month. Out of total 6 cases of hearing loss 4 were male and 2 were female. **Conclusion:** Thus we conclude that incidence of hearing loss was 17.14 and it was found more among male as compare to female was completely reversible.

**Key Words:** Spinal anaesthesia, transient hearing loss, audiometry.

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## INTRODUCTION

Spinal anaesthesia is one of the most frequent regional anaesthesia techniques in surgical interventions, being used in all procedures below the umbilicus<sup>1-4</sup>. The advantages over general anaesthesia includes, cost reduction and elimination of the need for endotracheal intubation thus reducing the risk of aspiration of gastric content, and respiratory infection.<sup>ref4-4-7</sup> However, technique is not suitable for procedures longer than two

hours and difficult access/failed cerebrospinal fluid (CSF) tap may occur<sup>5</sup>. Transient sensorineural hearing loss in the low frequencies can be observed after spinal anesthesia<sup>6-9</sup>. Reported incidence rates of hearing loss after spinal anesthesia range between 0.2 and 8%. This rate can even be as high as 92% in some categories of high risk patients<sup>6,9,10</sup>. The occurrence of hearing disorders after spinal anesthesia is frequently associated with the “postspinal headache syndrome”<sup>7,11</sup> and is probably associated with a lesion of the cranial nerve<sup>9-7</sup>. These clinical symptoms result most likely from a loss of cerebrospinal fluid (CSF) by a leakage via the spinal puncture hole<sup>11</sup>. This CSF loss, in turn, results in a subsequent decrease in intracranial and intracochlear pressure<sup>7,11,12</sup>.

## MATERIALS AND METHODS

The present study was conducted in department of anaesthesiology of Dr Ulhas Patil Medical College. In the present study patients were selected from the age group of 20 to 60 and having normal hearing power. All the

selected patients were of ASA grade I and II. Patients who were not willing for Spinal anesthesia or not willing to participate the study were excluded from the study. The study was conducted for the period of six month and total 35 patients were enrolled in the present study. Preanesthetic examination was conducted among all the selected study patients. Detailed physical examination was also carried out and the findings were recorded in prestructured proforma. Spine was examined to see presence of any skin infection, deformity, calcification, movements and history of previous operation. Audiometry was performed in all the patients before surgery. Repeat audiogram was taken on second and fifth day following surgery to record the hearing loss. Audiometry was done in a sound-proof room using Arphi portable audiometer. The collected information was analysed by using the SPSS software and was presented using appropriate tables and graphs.

## RESULTS

**Table 1:** Distribution of patients according to Age, sex and ASA grade

	No. of patients	%	
Age group	21-30	14	40.00
	31-40	9	25.71
	41-50	7	20.00
	51-60	5	14.29
Sex	Male	21	60.00
	Female	14	40.00
ASA grade	ASA I	31	88.57
	ASA II	04	11.43

In the present study total 35 cases were studied and it was seen that majority of the patients (40%) were in the age group of 21-30 years followed by 31-40 years of age (25.71%). 60% patients were male and 40% were female. 88.57% patients were of ASA grade I and remaining 11.43% were of ASA grade II.

**Table 2:** Distribution according to characteristics of patients

Parameter	Mean± SD
Weight	65.6±3.7
Height (cm)	161.9±6.8
Duration of surgery (min)	52.6±10.7
Maximal height of spinal block (thoracic)	8.2±0.9

It was seen that the mean weight and height of study patients was 65.6±3.7kg and 161.9±6.8 respectively. The mean duration of surgery was 52.6±10.7min and maximal height of spinal block (thoracic) 8.2±0.9.

**Table 3:** Distribution of subjects according various complications

	No. of patients	%
Transient hearing loss	6	17.14
Post spinal headache	7	20.00
Post spinal hypotension	11	31.43

It was seen that 17.14% patients developed transient hearing loss. Post spinal headache was seen in 20% patients and post spinal hypotension was seen in 31.43% patients.

**Table 4:** Distribution according to patients with significant hearing loss

Frequency HZ	No. of patients	%
125	0	0.00
250	0	0.00
500	1	2.86
1000	1	2.86
2000	3	8.57
4000	1	2.86
6000	0	0.00
8000	0	0.00
<b>Total</b>	<b>6</b>	<b>17.14</b>

It was seen that majority of the patients (3 cases) were having hearing loss at 2000Hz. At 500Hz, 1000Hz and 4000Hz one case each was diagnosed. All the patients were followed for one month and it was observed that the hearing loss was completely reversed in one month.

**Table 5:** Age and sex wise distribution of patients with Transient hearing loss

Age Group	Sex		Total
	Male	Female	
20 – 30	0	0	0
31 – 40	1	1	2
41 – 50	2	1	3
51 – 60	1	0	1
<b>Total</b>	<b>4</b>	<b>2</b>	<b>6</b>

It was observed that out of total 6 cases of hearing loss 4 were male and 2 were female. Three cases were in the 41-50 years and two were in the age group of 31-40 years.

## DISCUSSION

In the present study we studied total 35 cases with the aim to study post spinal anesthesia hearing loss observed in tertiary care institute. It was seen that majority of the patients (40%) were in the age group of 21-30 years followed by 31-40 years of age (25.71%). Majority of the patients were male (60%). 88.57% patients were of ASA grade I and remaining 11.43% were of ASA grade II. The findings were consistent with the findings reported by Bansode Apeksha *et al*<sup>13</sup>, P L Sirsamkar *et al*<sup>14</sup> and Nefissa M. Amr *et al*<sup>15</sup>. It was seen that the mean weight and height of study patients was 65.6±3.7kg and 161.9±6.8 respectively. The mean duration of surgery was 52.6±10.7min and maximal height of spinal block (thoracic) 8.2±0.9. Walter Schaffartzik<sup>16</sup> and Sirsamkar *et al*<sup>14</sup> also observed similar findings. Various complications among the study patients were studied and it was seen that post spinal headache was seen in 20% patients and post spinal hypotension was seen in 31.43% patients. It

was seen that 17.14% patients developed transient hearing loss. A.O. Lasisi *et al*<sup>17</sup> found the incidence of bone conduction hearing loss complicating spinal anaesthesia to be 15%. As compared to present study Sirsamkar *et al*<sup>14</sup> (8%) and Yildiz *et al*<sup>18</sup> (7.5%) reported incidence of hearing loss in their study. Transient hearing loss (HL) after spinal anaesthesia occurs more often than is generally assumed and the symptoms might not be recognized<sup>19</sup>. It was seen that majority of the patients (3 cases) were having hearing loss at 2000Hz. At 500Hz, 1000Hz and 4000Hz one case each was diagnosed. All the patients were followed for one month and it was observed that the hearing loss was completely reversed in one month. It was observed that out of total 6 cases of hearing loss 4 were male and 2 were female. Three cases were in the 41-50 years and two were in the age group of 31-40years. Gultekin and Ozcan<sup>20</sup> compared the incidence of hearing loss after spinal anaesthesia in young and elderly using PTA. They observed that there was significant hearing loss among the younger age group patients as compared to elderly in the low frequency range (52% vs 16%) (P=0.014). L.P. Wang *et al*<sup>6</sup> after studying the effects of spinal anaesthesia on hearing have reported that transient hearing loss for low frequency was totally reversible. The mechanism of hearing loss after spinal anaesthesia has also been attributed to the disruption of the endolymph/perilymph balance caused by the decrease CSF pressure<sup>21</sup>. The perilymph is the substrate of the inner hair cells and is present in the cochlea, it's a filtrate of the blood and CSF, and communicate with the subarachnoid space through the cochlear aqueduct<sup>22</sup>. The CSF dynamics are important for auditory function of the inner ear. The puncture of the dura membrane results in CSF leak and a drop in CSF volume and pressure. The reduced subarachnoid pressure is transmitted into the inner ear via the cochlear aqueduct resulting in a transient reduction of perilymphatic pressure causing endolymphatic hydrops. This endolymphatic hydrops is associated with hearing loss<sup>23</sup>.

## CONCLUSION

Thus we conclude that incidence of hearing loss was 17.14 and it was found more among male as compare to female was completely reversible.

## REFERENCES

- Walsted A. Effects of cerebrospinal fluid loss on hearing. *Acta Otolaryngol.* 2000; 543:95- 98.
- Lee C. Hearing loss after spinal anaesthesia. *Anesth Analg.* 1990; 71:561-569.
- Michel O, Brusis T. Hearing loss as a sequel of lumbar puncture. *Ann Otol Rhinol Laryngol.* 1992; 101:390-394.
- Day CJE, Shutt LE. Auditory, ocular and facial complications of central neural block: a review of possible mechanisms. *Reg Anesth.* 1996; 21:197-201.
- Erkan K, Sitki G, Cengiz D, Yasemin I, Muzaffer K. Evaluation of Hearing Loss after Spinal Anaesthesia with Otoacoustic Emissions. *Eur Arch Oto-Rhino-Laryngol.* 2006; 263:705-710.
- Wang L. P., Fog J., Bove M., Transient hearing loss following spinal anaesthesia, *anaesthesia*, 42, 1258-63, 1987.
- Wang L. P., Sudden bilateral hearing loss after spinal anaesthesia. A case report, *acta anaesthesiol scand.*, 30 (5), 412-3, 1986.
- Dreyer M., Migdal H., Transient medium- and deep-tone hearing disorders following spinal anaesthesia, *reg. anaesth.*, 13 (6), 138-41, 1990.
- Schaffartzik W., Hirsch J., Frickmann F., Kuhly P., Ernst A., Hearing loss after spinal and general anaesthesia: A comparative study, *anesth. analg.*, 91 (6), 1466-72, 2000.
- Kiliçkan L., Gürkan Y., Aydin O., Etiler N., The effect of combined spinal-epidural (CSE) anaesthesia and size of spinal needle on postoperative hearing loss after elective caesarean section, *clin. otolaryngol. allied sci.*, 28 (3), 267-72, 2003.
- Panning B, Lehnhardt E, Mehler D. Transient low frequency hearing loss following spinal anaesthesia [in German]. *Anaesthesist* 1984; 33:593-5.
- Marchbanks RJ. Hydromechanical interactions of the intracranial and intralabyrinthine fluids. In: Ernst A, Marchbanks R, Samii M, eds. *Intracranial and intralabyrinthine fluids: basic aspects and clinical applications.* Berlin: Springer, 1996:51-61.
- Bansode Apeksha, Lalita Afzal, Valsamma Abraham, Navneet Kumar. Age comparative study on spinal anaesthesia and auditory functions. *Journal of Evolution of Medical and Dental Sciences.* 2012; 1(6): 1026-33.
- P L Sirsamkar, Sudhir W Bhope. Study of transient hearing loss after subarachnoid block. *Medpulse-International Medical Journal* October 2014; 1(10): 634 - 637.
- Nefissa M. Amr And Elham El-Saiid. Hearing Loss after Spinal Anaesthesia: A Too Little Appreciated Complication? *Med. J. Cairo Univ.* 2014; 82(1): 321-329.
- Walter Schaffartzik, Jan Hirsch, Frank Frickmann, Peter Kuhl, and Arneborg Ernst. Hearing Loss after Spinal and General Anaesthesia: A Comparative Study. *AnesthAnalg*2000;91:1466-72
- A.O. Lasisi, H.O. Lawal, A.A. Sanusi. Effect of Spinal Anaesthesia on Hearing Threshold. *East and Central African Journal of Surgery.* 2010; 15(2):80-84.
- Yildiz TS, Solak M, Iseri M, Karaca B, Toker K. Hearing loss after spinal anaesthesia: the effect of different infusion solutions. *Otolaryngol Head Neck Surg.* 2007; 137:79-82.
- Karatas E., Göksu S., Durucu C., Isik Y. and Kanlikama M.: Evaluation of hearing loss after spinal anaesthesia with otoacoustic emissions. *Eur. Arch. Otorhinolaryngol.*, 263 (8): 705-10, 2006.
- Gultekin S, Ozcan S. Does hearing loss after spinal anaesthesia differ between young and elderly patients? *Anaesth Analg* 2002; 94(5): 1318-20

21. Johkura K, Matsushita Y, Kuroiwa Y. Transient hearing loss after accidental dural puncture in epidural block. *Eur J Neurol.* 2000; 7:125-126.
22. Kiliçkan L, Gürkan Y, Ozkarakas H. Permanent sensorineural hearing loss following spinal anesthesia. *Acta Anaesthesiol Scand.* 2002; 46:1155-1157.
23. Hussain SS, Heard CM, Bembridge JL. Hearing loss following spinal anaesthesia with bupivacaine. *Clin Otolaryngol Allied Sci.* 1996; 21:449-54.

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