

# Study of post spinal anesthesia hearing loss: A hospital based study

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## Abstract

**Background:** Spinal anaesthesia is one of the most frequent regional anaesthesia techniques in surgical interventions, being used in all procedures below the umbilicus. Hearing loss following spinal anaesthesia is a known yet uncommonly reported complication with incidence between 0.4% and 40%, affecting the low frequency range. **Aims and Objective:** To study the post spinal anesthesia hearing loss observed in tertiary care institute. **Materials and Method:** In the present study total 30 cases admitted for various surgeries under spinal anesthesia in the institute were enrolled. Informed written consent was obtained from each patient. Pre-anesthetic examination was done in all the patients. Audiometry was performed in all the patients before surgery in a sound-proof room using Arphi portable audiometer. Post operative hearing loss was recorded on second and fifth day following surgery. The audiogram was repeated after one month of surgery to verify if return to normally of hearing power had occurred. The complications that have occurred had also been recorded. All the findings were recorded on a prestructured proforma. **Results:** Majority of the patients (40%) under the study were between the age group of 21-30 years followed by 31-40 years of age (26.67%). Majority of the patients were male (60%) and 90% patients were of ASA grade I. Transient hearing loss was diagnosed in 13.33% patients. Post spinal headache was seen in 16.67% patients and post spinal hypotension was seen in 23.33% patients. Two cases were having hearing loss at 2000Hz while at 250Hz and 6000Hz 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. **Conclusion:** Thus we conclude that transient hearing loss was diagnosed in 13.33% patients and it was found that hearing loss was completely reversible.

**Key Words:** Hearing loss, spinal anesthesia, Frequency.

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## INTRODUCTION

Pain is one of man's most distressing experiences. Relief of pain during surgery is the aim of anesthesia. Although pain demands relief on humanitarian ground also, in many cases treatment reduces physical morbidity after operation. Spinal anaesthesia is one of the most frequent regional anaesthesia techniques in surgical interventions, being used in all procedures below the umbilicus<sup>1,2</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>3,4</sup> However, technique is not suitable for procedures longer than two hours and difficult access/failed cerebrospinal fluid (CSF) tap may occur<sup>5,6</sup>. Hearing loss following spinal anaesthesia is a known yet uncommonly reported complication with incidence between 0.4% and 40%, affecting the low frequency range<sup>3,4</sup>. Other complications that have been reported included postural headache, nausea, vomiting, vertigo and urinary retention with incidence ranging between 0.4% and 17%<sup>6,7</sup>. Hearing loss has also been reported in other clinical situations, involving opening of the duramater resulting in leakage of CSF like lumbar puncture<sup>8</sup>, myelography, vp shunts, acoustic neuroma surgeries and neurosurgeries. In the present study we tried to study the post spinal hearing loss observed in the study institute.

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## MATERIALS AND METHOD

The present study was conducted in the department of anesthesiology of Dr Ulhas Patil Medical College, Jalgaon with objective to study the hearing loss observed after spinal anesthesia. Following inclusion and exclusion criteria was used to select the study population.

### Inclusion Criteria

- Patients admitted for various surgeries under spinal anesthesia in the institute.
- Patients from the age group of 20 to 60.
- Normal hearing power
- Patients in ASA grade I or II classification

### Exclusion Criteria

- Patients not willing for Spinal anesthesia or nervous or very apprehensive patients
- Patients with pre-existing hearing impairment.
- Patients with ASA grade III or more.

Thus by using the above mentioned inclusion and exclusion criteria total 30 cases were selected for the study. Informed written consent was obtained from each patient. Pre-anesthetic examination was done in all the patients. Detailed physical examination was carried out. 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 in a sound-proof room using Arphi portable audiometer. Post operative hearing loss was recorded on second and fifth day following surgery. The audiogram was repeated after one month of surgery to verify if return to normally of hearing power had occurred. The complications that have occurred had also been recorded. All the findings were recorded on a prestructured proforma.

## RESULTS

**Table 1:** Age, sex and ASA grade distribution of study subjects

		No. of patients	%
Age group	21-30	12	40.00
	31-40	8	26.67
	41-50	6	20.00
	51-60	4	13.33
Sex	Male	18	60.00
	Female	12	40.00
ASA grade	ASA I	27	90.00
	ASA II	03	10.00

It was observed that majority of the patients (40%) under the study were between the age group of 21-30 years followed by 31-40 years of age (26.67%). Majority of the patients were male (60%) and 90% patients were of ASA grade I.

**Table 2:** Distribution according to Haemodynamic changes

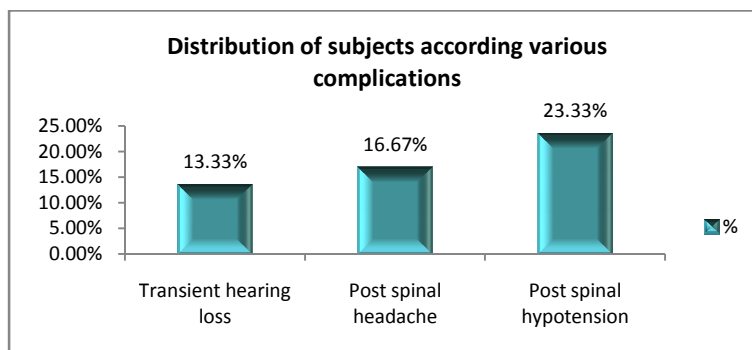
	Systolic blood pressure (mmHg)	Diastolic blood pressure (mmHg)	Mean arterial Pressure (mmHg)
Pre Operative	126.65±14.76	82.34±8.57	82.45±4.65
Post Operative	114.43±12.54	61.23±7.43	76.65±5.62

The mean preoperative systolic blood pressure was 126.65±14.76 and mean post operative systolic blood pressure was 114.43±12.54 mm of Hg. The mean pre and post operative diastolic blood pressure was 82.34±8.57 and 61.23±7.43 mm of Hg respectively.

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

	No. of patients	%
Transient hearing loss	4	13.33
Post spinal headache	5	16.67
Post spinal hypotension	7	23.33

Transient hearing loss was diagnosed in 13.33% patients. Post spinal headache was seen in 16.67% patients and post spinal hypotension was seen in 23.33% patients.



**Figure 1**

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

Frequency HZ	No. of patients	%
125	0	0.00
250	1	3.33
500	0	0.00
1000	0	0.00
2000	2	6.67
4000	0	0.00
6000	1	3.33
8000	0	0.00
<b>Total</b>	<b>4</b>	<b>13.33</b>

It was seen that two cases were having hearing loss at 2000Hz while at 250Hz and 6000Hz 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.

## DISCUSSION

The present study was conducted in the department of anesthesiology of Dr Ulhas Patil Medical College, Jalgaon with objective to study the hearing loss observed after spinal anesthesia. It was observed that majority of the patients (40%) under the study were between the age group of 21-30 years followed by 31-40 years of age (26.67%). Majority of the patients were male (60%) and 90% patients were of ASA grade I. P L Sirsamkaret *al*<sup>9</sup> also observed that majority of the in the age group of 21 to 30 years in their study. Similar findings were also observed Bansode Apeksha *et al*<sup>10</sup>, A.O. Lasisi *et al*<sup>12</sup> and Nefissa M. Amr *et al*<sup>11</sup>. The mean preoperative systolic blood pressure was 126.65±14.76 and mean post operative systolic blood pressure was 114.43±12.54 mm of Hg. The mean pre and post operative diastolic blood pressure was 82.34±8.57 and 61.23±7.43 mm of Hg respectively. Nefissa M. Amr<sup>11</sup> reported the mean maximum decrease in MAP was 74.40±7.22 mm of Hg in their study. Transient hearing loss was diagnosed in 13.33% patients. Post spinal headache was seen in 16.67% patients and post spinal hypotension was seen in 23.33% patients. P L Sirsamkar *et al*<sup>9</sup> observed 8% patients were suffering from transient hearing loss in their study. A.O. Lasisi *et al*<sup>12</sup> found the incidence of bone conduction hearing loss complicating spinal anesthesia to be 15%. Yildiz *et al*<sup>13</sup> reported incidence of hearing loss of 7.5% in their study. It was seen that two cases were having hearing loss at 2000Hz while at 250Hz and 6000Hz 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. Bansode Apeksha *et al*<sup>10</sup> observed the overall incidence of 7.7% significant hearing loss after spinal anesthesia. In Group Y (young patients) of their study 2 patients (6.6%) developed significant hearing loss at 1000Hz. In groups

M (middle aged) 4 patients (13.3%) had significant hearing loss. One developed hearing loss at 125Hz while the other 3 patients had hearing loss at 6000Hz and 8000Hz. In group E (elderly patients) only one patient (3.3%) developed significant hearing loss at 250 Hz. L.P. Wang *et al*<sup>3</sup> after studying the effects of spinal anesthesia on hearing have reported that transient hearing loss for low frequency was totally reversible. Occurrence of hearing disorders after spinal anaesthesia has frequently been reported to be associated with post-spinal headache syndrome<sup>14</sup>. Several authors have suggested an association between post dural puncture headache and hearing loss<sup>3</sup>. PDPH is generally attributed to decrease intracranial pressure caused by CSF leak through the dural puncture a phenomenon similar to that attributed for hearing loss following spinal anaesthesia<sup>15</sup>. According to Arnlvg *et al*<sup>16</sup> transient decrease in hearing after lumbar puncture is associated with decrease in the cerebrospinal fluid pressure which may be transmitted via cochlear aqueduct and resulting in corresponding decrease in perilymphatic pressure, this mechanism resulting in auditory disturbances. According to Hughson W *et al*<sup>17</sup> decreased cerebrospinal fluid pressure predisposes to the reduced intralabyrinthine pressure with resultant transient hearing loss.

## CONCLUSION

Thus we conclude that transient hearing loss was diagnosed in 13.33% patients and it was found that hearing loss was completely reversible.

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