

# Correlation of temporary hearing loss and hypotension in spinal anesthesia

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## Abstract

**Introduction:** Mild and transient hearing deficiency is not very uncommon after anaesthesia which improves before patient is fully aware of the problem. The hearing loss is either unilateral or bilateral, low frequency and usually reverses spontaneously. Among the various complications an association has been observed transient hearing loss and spinal hypotension. **Aims and Objectives:** To study the association between temporary hearing loss and hypotension in patients undergoing spinal anesthesia. **Material and Method:** In the present study 50 subjects were selected who were posted for various surgeries under subarachnoid block. Normal hearing power has been the first precondition for patient selection in study. Preanesthetic examination was conducted in all the study patients. Audiometry was performed in all the patients before surgery. To record the hearing loss audiogram was taken on second and fifth day following surgery in the audiometry room. The hearing loss and hypotension in the subjects was recorded and compared. **Results:** Majority of the subjects (48%) were in the age group of 21 to 30 years followed by 41-50 years group (22%). 58% subjects were male. Among the various complications Post spinal hypotension was observed in 20% subjects whereas Post spinal headache was reported by 14% subject. The incidence of transient hearing loss was observed to be 8%. Out of total 10 cases of spinal hypotension, Transient hearing loss was observed in three cases. On statistical analysis the difference observed in Transient hearing loss and Spinal hypotension was statically significant. **Conclusion:** Thus we conclude that there is significant association between temporary hearing loss is with hypotension in spinal anesthesia.

**Keywords:** hearing loss, hypotension, spinal anesthesia.

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## INTRODUCTION

Spinal subarachnoid analgesia has enjoyed varying degree of popularity from early enthusiastic acceptance to complete rejection, resulting from the fact that the technique possesses at one and same time superb advantages and serious drawbacks. Spinal anesthesia is not certainly an accidental success. Despite introduction of numerous excellent inhalational and intravenous drugs as well as potent neuromuscular relaxants spinal anesthesia has maintained its popularity especially in

underdeveloped and developing countries. In our country where hospital facilities in rural area are minimum, the regional anaesthetic technique is the best as it requires less equipment, minimum preparation of the patient and less postoperative observation. Since the discovery of local anesthetic drugs the need for pain relief without loss of consciousness is appreciated more and more by the anesthetist and surgeon. There has been revival of interest in regional technique where control of ventilation is not required. Narcotics can be omitted in operative time avoiding ventilator depression. Various complications have been reported by various authors and studies. The most common complication observed are post-dural headache, hypotension and bradycardia. Direct nerve damage, hypothermia, damage to the spinal cord and spinal infection are some rare complication. Mild and transient hearing deficiency is not very uncommon after anaesthesia which improves before patient is fully aware of the problem.<sup>1</sup> The first reported case of hearing impairment after spinal anaesthesia was reported in 1914.<sup>2</sup> Since then, it has been well documented that reversible SNHL can occur after spinal anaesthesia and

following procedures involving lumbar puncture.<sup>3,4,5</sup> The hearing loss is either unilateral or bilateral, low frequency and usually reverses spontaneously although there are a few documented cases where the SNHL has not reversed.<sup>6</sup> Among the various complications an association has been observed transient hearing loss and spinal hypotension.

### AIMS AND OBJECTIVES

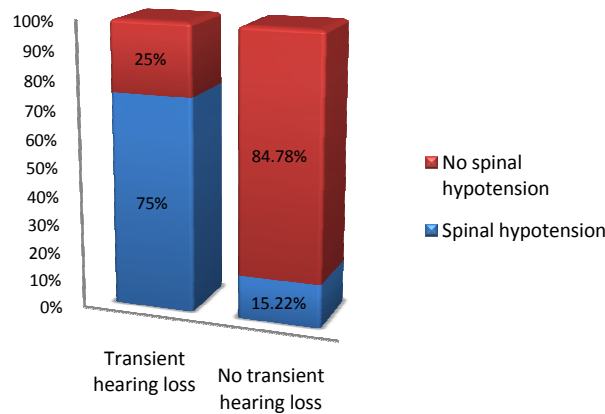
To study the association between temporary hearing loss and hypotension in patients undergoing spinal anesthesia.

### RESULTS

**Table 1:** Age and sexwise distribution of study subjects

Age Group	Sex		Total
	Male	Female	
20 – 30	11	10	21
31 – 40	4	4	8
41 – 50	6	5	11
51 – 60	8	2	10
<b>Total</b>	<b>29</b>	<b>21</b>	<b>50</b>

It was observed that majority of the subjects (48%) were in the age group of 21 to 30 years followed by 41-50



**Figure 1:** Association of temporary hearing loss and hypotension in spinal anesthesia

Out of total 10 cases of spinal hypotension, Transient hearing loss was observed in three cases. Spinal hypotension was not observed in 40 cases. Out of them one patient suffered from Transient hearing loss. On statistical analysis the difference observed in Transient hearing loss and Spinal hypotension was statically significant. Thus we could state that the Transient hearing loss was associated with Spinal hypotension.

### DISCUSSION

In the present prospective study we tried to find relation between Transient hearing loss and Spinal hypotension.

years group (22%). Sexwise distribution of patients showed that 58% subjects were male.

**Table 2:** Distribution of subjects according various complications occurred due to spinal anesthesia

Complication	No.	%
Transient hearing loss	4	8
Post spinal headache	7	14
Post spinal hypotension	10	20

The incidence of transient hearing loss was observed in 8% subjects. Post spinal hypotension was observed in 20% subjects whereas Post spinal headache was reported by 14% subject.

**Table 3:** Association of temporary hearing loss and hypotension in spinal anesthesia

		Spinal hypotension		Total
		Yes	No	
		Transient hearing loss	Yes 3 (75%)	
	No	7 (15.22%)	39 (84.78%)	46 (100%)
<b>Total</b>		<b>10</b>	<b>40</b>	<b>50</b>

$\chi^2 = 8.22, df=1, p=0.004$  (significant).

For this purpose we studied 50 cases under going spinal anesthesia for various surgeries. It was observed that majority of the subjects (48%) were in the age group of 21 to 30 years followed by 41-50 years group (22%). 58% subjects were male. Various complications were observed in the study. Out of them incidence of transient hearing loss was observed in 8% subjects. Post spinal hypotension was observed in 20% subjects whereas Post spinal headache was reported by 14% subject. It was observed that the hearing loss in the patients was temporary and all the patients regained hearing capacity to normal within one month. Vandam and Dripps<sup>43</sup> studied 9277 cases of

spinal anesthesia in which auditory difficulties in 35 cases. Auditory complaints included decreased hearing, obstruction, plugging, popping, and tinnitus. Overall incidence in women was twice than men. Tinnitus and deafness may occur and are explained on the basis of low cerebrospinal pressure resulting in low intra labyrinthine pressure and consequent hearing loss. L.P. Wang *et al*<sup>8</sup> after studying the effects of spinal anesthesia on hearing have reported that transient hearing loss for low frequency was totally reversible. Incidence of transient hearing loss was 42% in their study. In the contrary our study had reported the incidence of 8% only; which was not comparable with the above study. But the hearing loss in all the patients was transient and all the patients had regained their normal hearing in one month. Significant fall of blood pressure of 30mm of Hg or more was noted in 10 patients during intraoperative period (mean of preoperative 126.7 and postoperative 96.8mm Hg) and was treated with intravenous fluids only. It was observed that the degree of hypotension was greater at higher levels of spinal anesthesia. Symptoms of CSF leak commonly include headaches, which are more severe in the upright position and are alleviated by supine or head-lowered below chest (Trendelenburg) positioning. Horizontal diplopia, change in hearing, tinnitus, blurring of vision, facial numbness, nausea, and upper limb radicular symptoms (tingling) may occur. These symptoms are nonspecific as they are commonly encountered in migraine and post-traumatic headache. Cognitive decline has also been reported Hong *et al*<sup>9</sup> and Pleasure *et al*<sup>10</sup>. The precise mechanism of this transient hearing loss has not yet been completely established. It has been suggested that following dural puncture the decrease in the CSF volume and pressure that occurs leads to a decrease of perilymph as there is a direct communication between the CSF and perilymph via the cochlear aqueduct. The reduction in perilymphatic pressure would then induce a transient endolymphatic expansion for equilibration.<sup>3,11,12</sup> This endolymphatic hydrops is associated with the hearing loss and restoration of the CSF and inner ear volumes would then lead to a return of normal hearing thresholds. The contrast medium, metrizamide which is used in lumbar myelography is associated with transient deafness. The mechanism of action is probably due to a hydrostatic imbalance between the perilymph and CSF resulting from a decreased CSF osmolality.<sup>13</sup> Hypotension after spinal anesthesia is due to sympathetic nervous system blockade. Common but usually easily treated with intravenous fluid and sympathomimetic drugs such as Ephedrine,

Phenylephrine or Metaraminol. In the present study it was observed that there was a strong association between transient hearing loss and spinal hypotension. And the difference observed was also statistically significant. In the present study out of total 10 cases of spinal hypotension, Transient hearing loss was observed in three cases. Spinal hypotension was not observed in 40 cases. Out of them one patient suffered from Transient hearing loss. On statistical analysis the difference observed in Transient hearing loss and Spinal hypotension was statically significant. This proves the association between Transient hearing loss with Spinal hypotension.

## CONCLUSION

Thus we conclude that there is significant association between temporary hearing loss is with hypotension in spinal anesthesia.

## REFERENCES

1. Ahmed M, Chowdhury MRA, Islam MS, Ahmmed S. bilateral hearing loss after spinal anesthesia. JAFMC Bangladesh. 2009;5(1):53-55
2. Terrien F. and Prelat P. Paresis of the sixth cranial nerve and bilateral hearing decrease following spinal anaesthesia. Arch d'ophtalmol. 1914; 34, 111-116
3. Walsted A. Effects of cerebrospinal fluid loss on hearing. Acta Otolaryngol. 2000; 543: 95-98
4. Lee C. Hearing loss after spinal anaesthesia. Anesth Analg. 1990; 71: 561-569
5. Fog J., Wang L., Sunberg A.. Hearing loss after spinal anaesthesia is related to needle size. Anesth Analg. 1990; 70: 517-522.
6. MICHEL O. and BRUSIS T. Hearing loss as a sequel of lumbar puncture. Ann Otol Rhinol Laryngol. 1992; 101: 390-394
7. Vandam L.D., Drijyss R.D. : Journal of American Medical Association, 1956, 161-586-91.
8. L.P. Wang, J. Fog, B. Bove : Transient hearing loss after spinal anaesthesia – Anaesthesia, Vol.42, pages 1258-1263.
9. Hong M, Shah GV, Adams KM *et al.* spontaneous intracranial hypotension causing reversible frontotemporal dementia. Neurology 2002;58:1285-87.
10. Pleasure Sj and others. Spontaneous intracranial hypotension resulting in stupor caused by diencephalic compression. Neurology 1998;50:1854-57
11. Walsted A. (1998) Effects of cerebrospinal fluid loss on the auditory system. Clinical and experimental investigations. Dan Med Bull. 45/3, 268-281
12. Marchbanks R.J. and Reid A. (1990) Cochlear and cerebrospinal fluid pressure: their inter-relationship and control mechanisms. Br J Audiol. 24, 179-187
13. Hussain S.S.M., Heard C.M.B. and Bembridge J.L. (1996) Hearing loss following spinal anaesthesia with bupivacaine. Clin Otolaryngol. 21, 449-454

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