

## The influence of pregnancy on sensation of ear problems – ear problems associated with healthy pregnancy

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### Abstract

We wondered how many women had experienced a sensation of fullness in the ear during pregnancy. To address this question, data were obtained from a group of healthy women who attended the gynaecology clinic in our hospital as pregnancy cases between February 1995 and January 1998 and who volunteered to participate in our study. A control group was drawn from healthy female co-medical staff members of our hospital who had never been pregnant. The data used for comparing the two groups were taken from a questionnaire about ear problems that was presented to all subjects. The results suggest that ear problems may be increased in pregnancy, particularly for hypotensive pregnant women. However, even for pregnant women complaining of ear problems, pure-tone audiometry and impedance audiometry showed normal hearing in all cases. Furthermore, these women's complaints resolved completely on delivery of their babies.

**Key words:** Pregnancy; Hearing disorders; Tinnitus

### Introduction

It is well known that otosclerotic patients who have borne children find that their hearing deteriorated during the later months of one or more of their pregnancies (Barton, 1945). Fullness in the ear, tinnitus, autophonia, nasal obstruction, epistaxis, worsening of allergic rhinitis, and sinusitis are frequent complaints of pregnant women, that are often resolved on delivery of their children (Malm, 1987; Derkay, 1988; Gurr *et al.*, 1993; Weissman *et al.*, 1993). A case of the clinical course of Ménière's disease before, during and after pregnancy, suggested that the coincidence of the decline in osmolality with the increase in vertigo attacks points to serum osmolality as a possible factor in the effect of pregnancy on Ménière's disease (Uchide *et al.*, 1997). Tandon *et al.* (1990) reported brain auditory evoked potentials in pregnant women.

Worsening of tinnitus in the premenstrual period has also been reported (Gurr *et al.*, 1993). One of the authors of this present paper who is an audiologist and mother of three children complained of a sensation of fullness in the ear which occurred during each of her pregnancies and resolved completely on delivery of each of her children. We wondered how many other women had experienced a sensation of fullness in the ear during pregnancy.

### Materials and methods

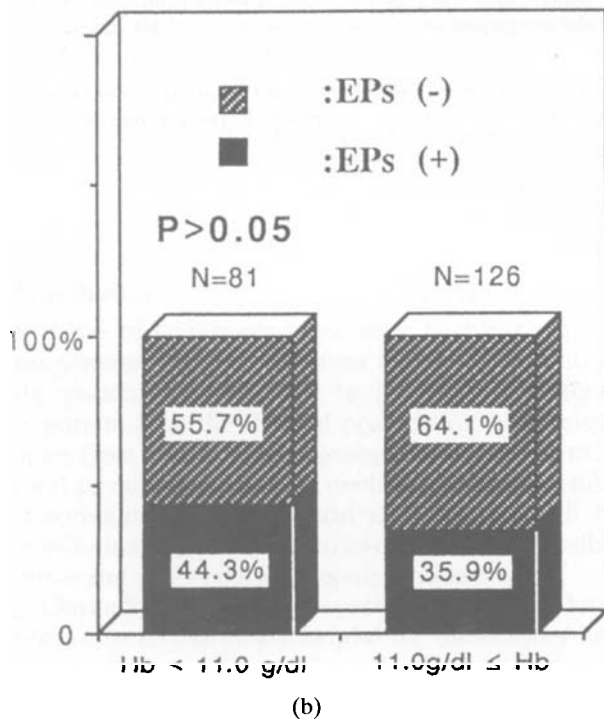
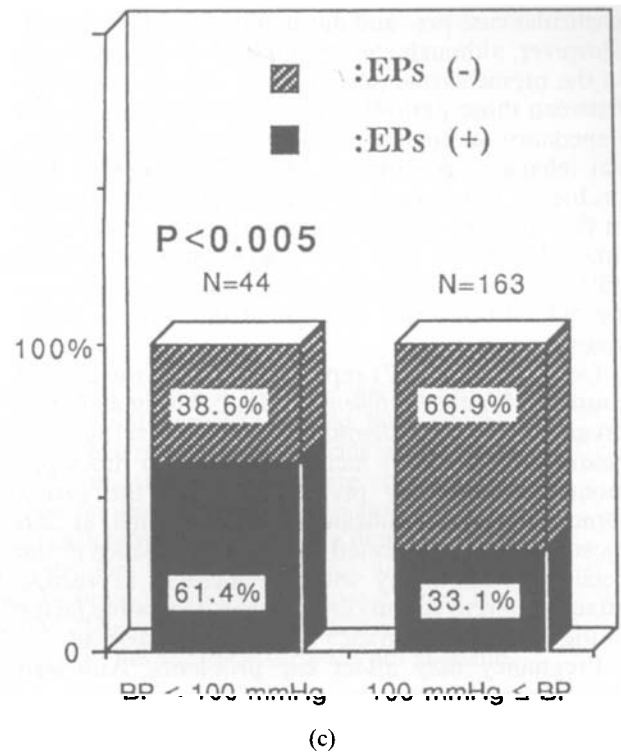
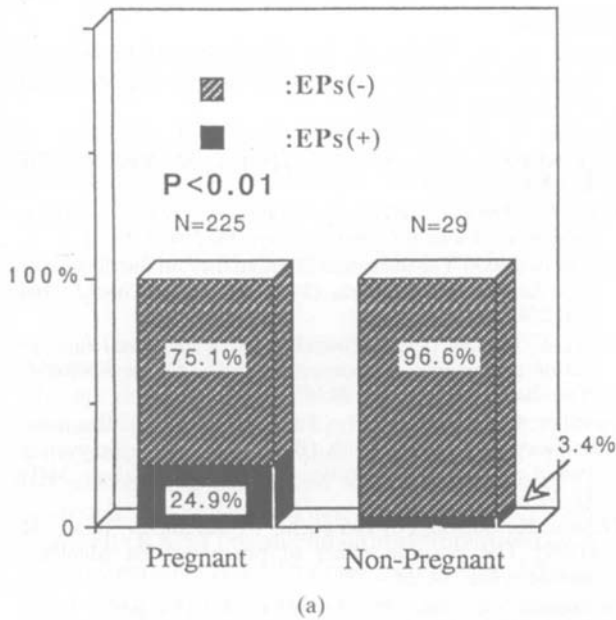
To address this question, data were obtained from a group of healthy women who attended the gynaecology clinic in our hospital as pregnancy

cases between February 1995 and January 1998 and who volunteered to participate in our study. A control group was drawn from healthy female co-medical staff members of our hospital who had never been pregnant. Before the study, all volunteers were screened for good ear/nose health using ear and nose physical examination, pure-tone audiometry, and impedance audiometry. The final subject population comprised 225 healthy pregnant women and 29 healthy women who had never been pregnant. The data used for comparing the two groups were taken from a questionnaire about ear problems that was presented to all subjects. In addition, for 207 cases in the pregnant group, we obtained measures of blood haemoglobin level (Hb) and measures of blood pressure when they were eight months pregnant.

### Results

Results from the questionnaire showed that 24.9 per cent of women in the pregnant group reported ear problems: fullness in the ear, tinnitus, and/or autophonia. Interestingly, all those reporting ear problems during pregnancy also reported that they resolved completely on delivery of their babies. Even amongst those complaining of ear problems, we could not detect any ear hearing loss or other problems in the pure-tone audiometry and impedance audiometry. Among the non-pregnant females, the incidence of ear problems was 3.4 per cent (one case, who reported experiencing ear problems during each premenstrual period). Chi-

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square analysis showed a significant group difference ( $p < 0.01$ ) in the incidence of ear problems (Figure 1-a).

To examine possible causes of ear problems in the pregnant group, the 207 cases for whom haemoglobin levels and blood pressure had been measured were divided into subgroups according to these results. In particular, they were divided into anaemic ( $Hb < 11.0$  g/dl) and non-anaemic ( $Hb \geq 11.0$  g/dl) groups, and also into hypotensive (systolic pressure  $< 100$  mmHg) and non-hypotensive (systolic pressure  $\geq 100$  mmHg) groups. Of the anaemic women from pregnant group, 44.3 per cent reported ear problems, while the incidence of ear problems in the non-anaemic pregnant women was 35.9 per cent. Chi-square analysis showed that this difference is not significant ( $p > 0.05$ ) (Figure 1-b). However, in the

hypotensive subgroup, there was a 61.4 per cent incidence of ear problems, while there was a 33.1 per cent incidence of ear problems in the non-hypotensive group. This difference is highly significant ( $p < 0.005$ ) (Figure 1-c).

### Discussion

Our results suggest that ear problems may be increased in pregnancy, particularly for hypotensive pregnant women. However, even for those pregnant women complaining of ear problems, pure-tone audiometry and impedance audiometry showed normal hearing in all cases. We could not study brainstem responses because we thought it was more invasive than pure-tone audiometry or impedance audiometry. However, Tandon *et al.* (1990) reported the brainstem auditory evoked potential in pregnant women. They compared eight cases of pregnant women at 30–40 weeks and 10 from age-matched non-pregnant controls. According to their results, the threshold for eliciting wave V of the brainstem auditory response was higher in pregnant women. The absolute peak latencies of waves I to V were similar in both groups. However, inter peak latencies I-III, III-V were on the higher side in the pregnant women, and I-V, in particular was significantly higher when compared with controls. These findings suggested that besides an increase in evoking wave V threshold, the neural condition process in brain stem auditory pathways during pregnancy is also delayed with +2SD of the mean central condition time in non-pregnant state.

Among the non-pregnant females, there was only one case who reported experiencing ear problems during each premenstrual period. We studied pure-tone audiometry and impedance audiometry in this

particular case pre- and during the menstrual period. However, although she complained of ear problems in the premenstrual period, there was no difference between those periods in pure-tone audiometry and impedance audiometry. This suggested that hormonal changes contributed to the subjective ear problems. Baker *et al.* (1977) compared the changes in the auditory threshold, during a four to six week interval between men and women on birth control pills. They suggested that the circulating female sex steroids affected the function of the sensory nerve system.

Uchide *et al.* (1997) reported a case of the clinical course of Ménière's disease before, during and after pregnancy. The endolymphatic hydrops (vertigo and hearing loss attacks) increased up to 10 times per month during early pregnancy, when the serum osmolality was significantly below normal at 286 mosm/kg. They suggested that the coincidence of the decline in osmolality with the increase in vertigo attacks point to serum osmolality as a possible factor in the effect of pregnancy on Ménière's disease.

Pregnancy may affect ear problems. Although this is not detected by pure-tone audiometry or impedance audiometry, pregnant women may experience the change subjectively. Furthermore, these women's complaints resolved completely on delivery of their babies. However, further investigations are needed, because a number of other factors, such as brainstem response, sex hormone and serum osmolality changes in pregnancy, may vary with the incidence of ear problems.

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