

BRACHIAL ARTERIAL BLOOD PRESSURE IN THE LATERAL RECUMBENT POSITION DURING PREGNANCY

by

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Introduction

Surprisingly little information regarding blood pressure recording in lateral recumbent position in either pregnant or non-pregnant subjects is available in literature although many articles have been written on supine hypotensive syndrome, its mechanism and its treatment.

During preliminary investigations directed towards further understanding of the mechanism of the supine hypotensive syndrome in late pregnancy, a fall in B.P. was found in most women examined during the last trimester when turned from the supine to right or left lateral position.

This observation was unexpected in view of previous reports of a rise in B.P. in pregnant women with the supine hypotensive syndrome when turned from the supine to lateral position. (Howard *et al* 1953; Holmes 1960, Wright 1962).

The present study has been undertaken because of the above contradictory findings.

Material and Method

One hundred and fifty pregnant women varying in age from 15-35 years were

selected at random from the antenatal clinics. The subjects were divided into three groups according to the period of amenorrhoea, i.e. 50 subjects in each trimester of pregnancy. As a control group, 50 normal non-pregnant subjects varying in age from 20-35 years were included in the study.

There was no psychological preparation of the subjects except for a small briefing explaining the procedure. The environment was that of a typical hospital obstetric out patient cubicle.

An erkameter (Sphygmomanometer) was used for B.P. recordings. Care was taken to ensure that the cuff was applied correctly over the medial aspect of the upper arm, which was maintained at the level of the heart during all recordings. The Korotkoff sounds were detected by placing the stethoscope lightly over the brachial artery in the antecubital fossa just distal to the lower margin of the arm cuff. Blood pressure was measured to the nearest mm Hg. The systolic pressure was taken as the highest level at which successive sounds were heard and diastolic pressure as the point at which the clear Korotkoff sounds became muffled. Three successive recordings of B.P. were taken at one minute intervals, the third reading being regarded as the most accurate.

Pulse and B.P. recordings were taken first in the sitting position. Then the sub-

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ject was placed in the supine horizontal position with the head resting on a pillow. After a few minutes rest, pulse and B.P. were recorded in the left arm. Next the subject was turned into right or left lateral position and the sphygmomanometer cuff applied to the uppermost arm. After 3-5 minutes rest, 3 successive B.P. recordings were taken. The pulse and B.P. recordings were taken both in the right and the left lateral recumbent positions.

The sequence of changes in the position of the subject was varied to ascertain whether this could have influenced the changes in B.P. recorded.

Observer error was nil as the recordings were taken by one individual.

Results

Non-Pregnant Control Subjects (Fig. 1)

Out of a total of 50 cases, the systolic B.P. showed an increase between 2-10 mm Hg. in 47 cases in the supine position when compared to sitting position. In 3 cases there was a fall of 2-4 mm Hg. The diastolic B.P. showed an increase between 2-10 mm Hg. in 31 cases and 19 cases showed no change in supine position as

compared to sitting position.

When these subjects were turned from supine to right lateral position, the systolic B.P. fell by 2-36 mm Hg in 50 cases. Only one case showed a fall of 36 mm Hg. The diastolic B.P. fell by 6-26 mm Hg. in 45 cases. Five cases did not show any change. The B.P. returned to near original level on resumption of the supine position.

When these subjects were turned from the supine to left lateral position, the systolic B.P. fell by 4-26 mm Hg. in 50 cases. The diastolic B.P. fell by 4-34 mm Hg. in 50 cases. The B.P. returned to near original levels on resumption of the supine position.

Subjects in First Trimester of Pregnancy (Fig. 2)

In 42 cases there was a rise of systolic B.P. varying from 2-20 mm Hg and in 8 cases there was no change in supine as compared to sitting position. Sixteen cases showed no change in diastolic B.P. and in 34 cases there was a rise in diastolic B.P. from 2-20 mm Hg. in supine position as compared to sitting position.

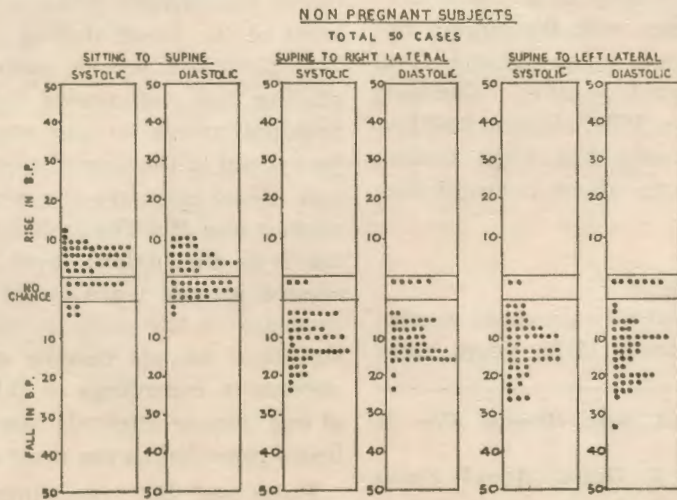


Fig. 1

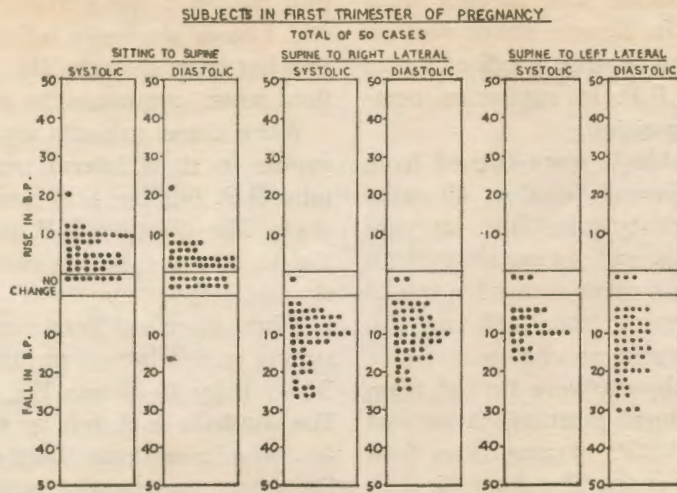


Fig. 2

When these subjects were turned from supine to right lateral position, there was a fall in systolic B.P. varying from 2-26 mm Hg. in 49 cases. In one case there was no change. The diastolic B.P. fell by 2-24 mm Hg. in 48 cases. In two cases there was no change.

When these subjects were turned from the supine to left lateral position, the systolic B.P. fell by 2-32 mm Hg. in 50 cases.

The diastolic B.P. fell by 2-30 mm Hg. in 47 cases. There was no change in 3 cases.

Subjects in Second Trimester of Pregnancy (Fig. 3)

Forty-eight cases showed a rise in systolic B.P. varying from 2-26 mm Hg. and in 2 cases there was no change in systolic B.P. in the supine position when compared to sitting position. Forty-six cases show-

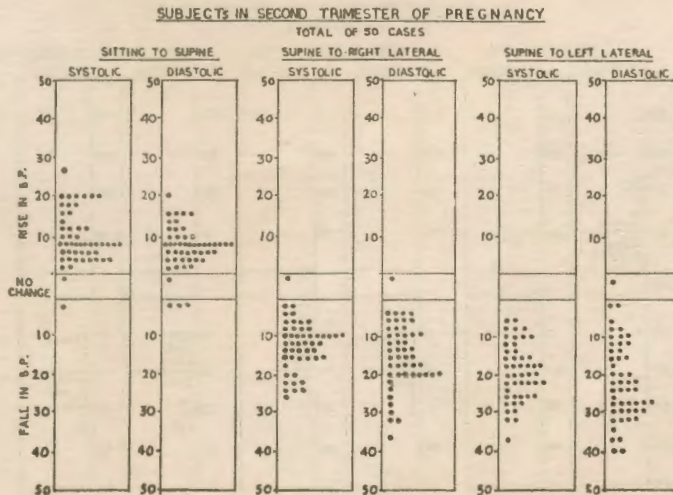


Fig. 3

giddiness, if at all they suffer from them, in the sitting or standing position. This is obvious because the circulation improves when the subject is lying down due to better venous return and increased cardiac output. But the findings of Wright (1962) are to the contrary. In his series of 100 pregnant women, the B.P. fell by 10-30 per cent when turned from sitting to supine position in 62 per cent of cases. Only in 8 per cent cases did the B.P. show a rise. How patients who feel giddy or nauseated in the sitting position, feel better when turned to supine position despite the fall in B.P. is however not explained.

Pregnant and non-pregnant subjects alike show a fall in systolic and diastolic B.P. in most cases when turned from supine horizontal to right or left lateral recumbent positions. The systolic drop was comparatively less than the diastolic drop in each group of cases. The greatest percentage change of B.P. occurs in the second and third trimesters. Trower and Walters (1968) in separate studies found that the brachial arterial B.P. fell in non-pregnant and pregnant subjects when they assumed a lateral recumbent position. These findings were in contrast with the fall in B.P. and relief of adverse symptoms that occur when pregnant women who develop the hypotensive syndrome are turned into a lateral position.

The explanation for this finding is rather obscure. If it were due to a generalised change in B.P., then one would expect more pregnant women to develop the hypotensive syndrome when lying on the side than when lying on the back. But clinical observations are to the contrary. It could be possible that the relief in symptoms is due to increase in the pulse pressure in lateral position. As already stated the diastolic B.P. fall is more than

that of systolic B.P. when the patient is turned from supine to lateral position.

It may be possible that these changes in B.P. are due to a local vascular phenomenon in the brachial artery. But do such phenomenon occur in other vessels also e.g. femoral artery? The results of preliminary studies in this regard by Trower and Walters (1968) are still inclusive.

As the change in B.P. occurs almost immediately after turning into a lateral position, it is possible that a neurovascular reflex may be responsible by altering the vascular tone and peripheral resistance.

Pregnancy does not appear to have aetiological bearing on the observed changes in B.P. as they can be demonstrated in the non-pregnant state.

Summary

Brachial arterial B.P. of non-pregnant and pregnant women was studied in sitting, supine and lateral recumbent positions.

It has been reported in the past that a certain number of pregnant women developed supine hypotensive syndrome in recumbent position and improved on turning to lateral positions. In contrast in the present study it has been found that B.P. of majority of women increased on attaining supine position and fell appreciably in lateral position.

This is a surprising finding and possible explanation of its mechanism and also the possible reasons for symptomatic relief in lateral positions in supine hypotensive syndrome despite a fall of B.P. are discussed.

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