Comparison of measured and estimated angles of table tilt at Caesarean section

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Background. Lateral maternal tilt reduces aortocaval compression and the consequent cardiovascular instability.

Methods. We measured the angle of table tilt used by 16 anaesthetists during uncomplicated, elective Caesarean section. After initiating anaesthesia, they were asked to position the patient and estimate the angle of tilt, which was then measured.

Results. Almost every anaesthetist positioned the patient less than 15° because they overestimated the angle of tilt. When questioned on their knowledge of the current advice for lateral tilt, 11 of the 16 anaesthetists were aware of the 15° recommendation.

Conclusion. Estimation of the angle of table tilt is unreliable.

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Aortocaval compression is exacerbated by lying supine and has adverse effects on mother and fetus.¹ Lateral tilt reduces aortocaval compression and its associated effects, which is important during Caesarean section as anaesthesia blunts the compensatory responses.

The common recommendation is a 15° lateral tilt which was first described by Crawford and colleagues in 1972,² and was achieved using a wedge. They demonstrated a significant improvement in fetal well-being when mothers were tilted rather than kept supine. However, the ideal amount of tilt varies with different mothers; the amount actually used is a compromise between patient and surgeon comfort and the perceived reduction in compression. Compression can occur even at more than a 15° angle, so
it is best to use as much tilt as possible. Morgan and colleagues state that estimating angles by eye is grossly inaccurate, with the true angle being much smaller than the estimated one. However, whilst this might be an expected finding, no published work has demonstrated or quantified it in obstetric anaesthetic practice.

Methods and results
The local hospital research ethics committee informed us that it was not necessary to obtain consent from the patients for this study as it involved observing routine anaesthetic practice. The study was conducted during uncomplicated, elective Caesarean sections. Patients with maternal or fetal problems such as pre-eclampsia, multiple pregnancy, or fetal growth retardation were excluded. We assessed 16 anaesthetists in one department whose anaesthetic experience ranged from 15 months to 25 yr. We were unable to include anaesthetists from another unit in the city because they had had recent teaching about the recommendation for 15° tilt.

Fifteen of the 16 Caesarean sections were performed under spinal anaesthesia, and one under general anaesthesia. The anaesthetists, who did not know the purpose of the study, positioned the patient and were then asked to estimate the degree of tilt that they had applied. The angle was measured using a protractor with a hanging weight. Finally, the anaesthetist was asked what the recommended angle of tilt was.

The measured table tilt was 7–15°; only one anaesthetist managed 15° (Fig. 1). Estimated tilt was 7–35°, and ten anaesthetists overestimated it by more than 10°. The four anaesthetists unaware of the 15° recommendation were among the most junior members of the department.

Comment
General awareness of the recommendation for 15° tilt during Caesarean section is of little use because estimation of the degree of tilt is unreliable. The importance of this finding is difficult to estimate. Aortocaval compression is probably greatest when supine, and least in the left lateral position, but little is known about what happens between these two extremes. Bamber found no significant difference in cardiac output between patients placed supine or with measured left or right lateral tilt of 5° and 12.5°, although mean values were lowest in the supine and right tilt positions. Pinder and colleagues studied mothers before and after insertion of a spinal anaesthetic; there were no significant differences in cardiac output at tilt angles of 2.5, 5 and 12.5°. There is no published evidence of the effect of tilts between 12.5° and 90°, so the recommendation of a 15° tilt is, to some extent, arbitrary.

Most of our anaesthetists thought they were using as much, or more than, the recommended degree of tilt. This is an important finding as it could make anaesthetists discount inadequate tilt as a cause of hypotension or collapse in a pregnant woman. Fitting operating tables with a simple device to measure the angle of tilt would act as both a reminder and a guide.

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