Preterm blood counts vary with sampling site

Sir,

Thurlbeck and McIntosh have recently studied the changes in neutrophil counts at different sampling sites.1 In their study, 0.5 ml of blood was drawn through an umbilical artery catheter, and then 0.5 ml was obtained by free flowing heel prick (n=13) or peripheral venepuncture (n=21). The average difference between the capillary compared with the arterial neutrophil counts was +1800 cells/mm. The difference in neutrophil counts between venous and arterial blood samples was not significant. They therefore concluded that it is important to sample from a vein or artery, rather than a capillary vessel, to avoid error in interpretation.

The cause for the increased neutrophil count in capillary blood is not clear from this study. One important possibility is that a rise in the blood neutrophil count during the prolonged capillary sampling may occur, induced by the pain it causes. This may also explain the higher variability found in the neutrophil counts in capillary blood.

A significant rise in white cell count from the marginal granulocyte pool may follow exercise or injection of epinephrine, and occurs with remarkable speed.2 Counts of 35 000 cells/mm have been recorded after a 400 m run completed in one minute.

We have recently studied the white cell count in venous blood before and 10 minutes after lumbar puncture in 20 neonates. There was a significant (p<0.001) increase in the white cell count from a mean (SD) of 9.6 (3.4)×10^9/l before, to 13.4 (3.7)×10^9/l after the procedure, caused by a rise in the neutrophils and lymphocytes. There is a reason to believe, therefore, that the higher neutrophil counts found in the samples from capillary blood were associated with the order of sampling used in the study and not necessarily with the site itself.3 If that is the case, venous and arterial sites will also fail to give reliable counts if samples are taken during or after stressful events. This question could have been answered if a third blood sample had been taken through the umbilical artery catheter after the capillary sampling, or if the order of sampling had been randomised.

References

3 Mordechai Shohat

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Dr Thurlbeck comments:

Dr Shohat's interesting letter raises points which would have been discussed more fully had space allowed. Arterial sampling, which does not disturb the infant, was performed first because of the effect of painful procedures on the neutrophil count in term infants which has already been described.1 This could well be a reason for the difference which we observed but it is of note that venous sampling, which is presumably painful too, had no effect. It is inaccurate to describe the observed difference as being due to the order of sampling as such, if the higher neutrophil counts with capillary sampling are, as Dr Shohat suggests, induced by demargination of granulocytes because of release of adrenaline caused by the pain of the sampling procedure itself.

Ethical considerations precluded capillary sampling both before and after arterial sampling, and a direct comparison
Establishment of an intermediate care ward for babies and mothers.
A M Weindling and R W Cooke

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