Vascular compromise in newborn infants

80 Kirk CR, Qureshi SA. Microsurgical vessel to preserve a preterm infant's ischaemic arm. BMJ 1988;297:1195.
84 Davison PM, Sully L. Microsurgical vessel to preserve a preterm infant's ischaemic arm. BMJ 1988;297:788.

Commentary

Severe examples of ischaemic limb damage, especially those culminating in amputation, have probably become less common as a result of increased vigilance for early signs of ischaemia, better catheters and related equipment, and improved skills of the operators. None the less, the rising population of extremely preterm babies are a vulnerable group and fear of retinopathy may lead to determined attempts at arterial oxygen monitoring by sampling through an arterial catheter or by repeated arterial puncture.

A range of physical signs may be observed which suggest limb ischaemia including mottling, blue discoloration, blanching, poor capillary refilling, coolness, and poor pulses. Often these signs are transient but sometimes they progress to frank gangrene with a demarcation line.

Mr Gault's informative and well referenced paper indicates the spectrum of treatments available, including the scope for surgery. A major difficulty for paediatricians is that there is still insufficient information derived from clinical studies to decide the appropriate management in individual circumstances, especially in extremely small babies. When signs of limb ischaemia are first observed we usually do not know whether they are due to reversible arterial 'spasm', thrombosis, or embolism. Dextran, heparin, streptokinase, and urokinase have risks in very small ill babies. Neonatal care is about balancing risks but we are hampered if neither the risks nor the benefits are understood. Finally, most paediatricians won't have ready access to a surgeon with experience in microsurgery—such experience that there is being embodied in single case reports.

Faced with these uncertainties the best approach is firstly to avoid unnecessary harm. A perceived risk of retinopathy is no reason to strive for arterial access at all costs. When invasion of arterial territory is contemplated there is always room for considering the alternative monitoring strategies. It would seem sensible to correct polycythaemia, hypovolaemia, and hypotension before arterial catheterisation, bearing in mind that these factors predispose to vascular compromise. Hyperosmolar solutions should not be infused through arterial catheters, and increased vigilance is required in babies receiving vasopressor drugs. The catheter should be promptly removed if signs of ischaemia, including early blanching, develop. It should not be replaced at the same site even if the signs regress.

The litigation implications of vascular compromise should be acknowledged. Medical and nursing staff must be protected from blame when there was no negligence; but we must also protect a patient's right to compensation where the standard of care was unreasonable. Accurate documentation in the medical and nursing records of events in relation to arterial catheterisation is a basis for the fair assessment of claims.

Arterial catheterisation, including unsuccessful attempts, should be noted and the time recorded. The same applies to arterial punctures—timed information on the blood gas chart is acceptable provided the site of the arterial sample is given. When an arterial catheter is in use a measurement of the adequacy of the circulation in the appropriate limb should be recorded at hourly intervals in the intensive care chart—for example, 'warm and pink'. Signs consistent with ischaemia should be recorded and timed. If, as a result, a catheter is removed then the time of removal must be noted. The progression or regression of ischaemic signs should be recorded along with the timing of any treatments.

In practice, a careful attitude towards documentation usually goes hand in hand with clinical vigilance and against this background unavoidable vascular compromise is less likely to occur.