HEPARIN CONTAMINATION OF SPECIMENS COLLECTED FROM ARTERIAL CANNULAE

Sir,—The investigation by Haynes and colleagues [1] of the accuracy of coagulation studies using arterial cannula samples raised the interesting question of contamination with heparin flush.

They cited Lew, Hutchinson and Lin [2], stating that accurate results may be obtained when 5 ml of blood is withdrawn and discarded before sampling. Consequently, they withdrew 5.6 ml of blood before collecting the sample.

In unpublished observations made on cardiothoracic surgical patients in theatre before heparinization, we found that, after the deadspace was discarded, sampling from a proximal port at 15 cm from the cannula necessitated 3 ml of blood to be wasted before achieving a "clean" sample. If blood was sampled at 150 cm from the cannula, deadspace plus 7 ml of blood had to be wasted to give an uncontaminated sample. We also used heparin 2 ml i ml⁻¹ in our flush; the coagulation tests in this small study were activated partial thromboplastin time and thrombelastography.

In the light of Haynes and colleagues' conclusion that "a blood sample from an arterial cannula may give clinically misleading information because of contamination with small amounts of heparin", it would seem inevitable that contamination would occur if sampling was made at a distance of about 200 cm from the cannula. However, their point of sampling was not stated.

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Sir,—The choice of reagent used for measuring activated partial thromboplastin time has a significant bearing on the degree to which heparin contamination prolongs the result [1]. This was not considered adequately by Lew, Hutchinson and Lin [2]. The reagents used in our study are used widely in haematology laboratories in Great Britain, and we feel that the results of our study are of direct relevance to clinicians in this country. Dr Main does not mention the reagent used in his unpublished work.

The samples in our study were taken 15 cm distant from the arterial cannula.

Thrombelastography is a useful technique for rapid diagnosis of a coagulopathy, but its interpretation is open to a degree of subjectivity. At present, its use remains confined to specialized units such as those involved in the provision of liver transplantation.

We believe that, unless shown otherwise in carefully conducted studies, the only practical solution to the problem is to accept the results of our work! That is, that heparin contamination in minute amounts may occur unpredictably in blood samples taken from arterial cannulae.

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EFFECT OF PEEP ON HYPERINFLATION

Sir,—We congratulate Dr Tan and colleagues on their well designed and informative study concerning the effects of PEEP in patients with obstructive airways disease [1].

While we have no argument with their findings or the conclusions drawn, we have noted a fundamental statistical error.

Two methods were used to measure intrinsic PEEP: these were airway pressure at the onset of inspiratory flow (Paw,0) and airway pressure obtained with expiratory port occlusion at end-expiration (Poc). The authors then calculated a correlation coefficient between the two variables and concluded they were "in reasonable agreement (r = 0.87)". Having reached this conclusion, they referred to only one measurement (Poc) in further analyses.

The misleading use of correlation coefficients in the comparison of two measurement techniques has been highlighted by Bland and Altman [2]. Regression analysis is used to predict one variable from another (i.e. y from x), whereas correlation measures the strength of a relation between two variables. This is not the same as agreement, nor does it describe accuracy.

Bland and Altman then described a method of measuring agreement between two measurement techniques. This involves using the average of the two measurements as the best estimate of the true value, and then obtaining the difference between this average and each of the measured values. A mean difference and SD are then obtained. These are the "bias" and "limits of agreement" of the measurement techniques.

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Sir.—The method of estimation of PEEP was not a prime consideration of our study, but merits further comment. Pao,0 is a measurement of end-expiratory alveolar pressure under dynamic conditions, while Poc is measured under static conditions. To average the two variables to obtain the "best estimate of the true value", as suggested, would be misleading. Nonetheless, the data have been examined by the method of Bland and Altman [1] and the two measurements are in "reasonable" agreement. The bias mean difference is 0.06 (so 0.17) kPa (fig. 1).

Poc (as a measure of whole-lung static PEEP) was used in our study to analyse the data of hyperinflation and effects of PEEPs as this is the standard method for the estimation of PEEP [2] and allows comparison with previous work. Poc has a high degree of reproducibility as the measurement is dependent on the resolution of the pressure transducer alone, whereas Pao,0 depends on the resolution of pressure, flow and the rate of data acquisition.

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