Without adequate confirmation of complete reversal such as thrombin time [6], I feel their conclusions on platelet function and postoperative blood loss must be questioned.

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Sir,—I appreciate Dr Gower's comments on our study which dealt with different anticoagulation regimens and platelet function in patients undergoing cardiac surgery operations. His major criticism was that heparin reversal was not adequately confirmed in our present study and that excess heparin was responsible for the more pronounced postoperative blood loss in the patients who received higher doses of heparin. Dr Gower is correct when he states that the activated clotting time (ACT) as a method for assessing heparin reversal with protamine has some limitations. However, I am convinced that it is not correct that "ACT is not suitable for the determination of the completeness of heparin reversal." Several studies in the clinical setting which focus on optimizing coagulation in cardiac surgery patients are based on monitoring ACT. In our study we also measured activated partial thromboplastin time (APTT) in the postoperative period (on the intensive care unit) from which, in addition to ACT, excessive heparin plasma concentrations can be excluded. There were no significant differences in ACT or APTT between the groups. Moreover, in patients who received heparin 600 u. kg\(^{-1}\) with aprotinin (group 4), postoperative blood loss was significantly lower than in the patients who received only heparin 600 u. kg\(^{-1}\) (group 3). Total doses of heparin in these two groups were not significantly different (group 3: 51 400±8050 u.; group 4: 50 900±7500 u.), although group 3 had a significantly higher blood loss and increased need for transfusion of homologous blood and blood products. Thus we do not agree that our conclusion on heparin, platelet function and postoperative blood loss must be questioned. However, Dr Gower is correct that direct measurements of heparin plasma concentrations (e.g. by a chromogenic method) may be helpful to exclude excessive heparin more accurately.

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Effects of oral nizatidine on preoperative gastric fluid pH and volume in children

Sir,—Mikawa and colleagues [1] recently published a paper on oral nizatidine, a new potent H₂ receptor antagonist for prophylaxis against pulmonary aspiration in children undergoing surgery. In addition to being wary of these new, more expensive, long-acting drugs used to treat a non-problem, I find it particularly upsetting that the standard for risk of aspiration still being used is the paper by Roberts and Shirley, published in 1974 [2]! I must admit that I too am guilty of quoting this paper [3], however, that was before a more recent paper by Raidoo and colleagues was published [4].

The basic defect in the study of Roberts and Shirley is that the information was never published in a peer reviewed journal for the conditions necessary to create aspiration pneumonitis in Rhesus monkeys. Raidoo and co-workers demonstrated that at least twice the volume (i.e. 0.8 ml kg\(^{-1}\)) with pH 1.0, was necessary to reproduce the results that Roberts and Shirley claimed they found in their laboratory. This markedly changes the population of children or adults who might be at potential risk for pulmonary aspiration of gastric contents [5].

Certainly, if the number of patients who came to the operating room as being "at risk" were as high as previously published, again, including my own study [6], the incidence of aspiration would be much higher than the documented rate of about 5 per 10000 anesthetics in children of physical status ASA I and II. The risk of aspiration is clearly related to gastric residual volume but the value of 0.4 ml kg\(^{-1}\) is flawed [5].

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Viscosities of commonly infused substances

Sir,—In anaesthetic practice, a wide range of drugs and solutions are infused. Poiseuille's law states that for a given driving pressure, fluid flow is inversely proportional to the viscosity. Design of infusion pumps must take into account the viscosity of the infused solution in order to determine the appropriate pressure generating capability. In the same way, viscosity determines the flow rate in gravity fed infusions for a preset reservoir height. Together with surface tension and orifice size and shape, it also determines the size of drop produced. Therefore, pumps or infusion controllers based on drop counts to deliver a required flow must be recalibrated for solutions of different viscosities and most manufacturers of these devices incorporate some means to accomplish this. In spite of this, the accuracy of volumetric controllers can only be expected to be ±10% [1]. To date, the literature has directed little attention to the viscosity of infusates plays in the performance of an infusion system.

Analysis of pressure-flow relationships of solutions yields an indication of the effective viscosity as it pertains to the performance of infusion systems. Resistance (Res) equals the ratio of pressure change (ΔP) to flow change (ΔF), when flow is changed from one rate to another (Res = ΔP/ΔF), and according to Poiseuille's law, is proportional to the viscosity of the infused. By comparing the individual values of Res for infusable substances, the relative viscosity of an infusion can be determined.

We have studied the effective viscosity of some commonly infused solutions relative to normal saline, using an IVAC model 560 volumetric infusion pump (IVAC Corp, San Diego, CA, USA), a constant fluid-flow source that provides continuous online pressure measurements with an accuracy of ±0.2 mm Hg [2]. First, saline was infused through device-specific infusion tubing.