increased capillary permeability, fever and end-organ injury that could be related to disruption of immunology function. We demonstrated increases of IL-6 and NF concentrations during cardiopulmonary bypass. Although many factors could account for the increases the changes may reflex surgical and/or cardiopulmonary bypass-induced depression of immunity in these patients. But, in cardiac surgery, it should be kept in mind that many factors including contact activation by blood interfacing with non-endothelial extracorporeal circuits, hyperthermia during rewarming, and foreign antigen administration can also produce cytokin and inflammatory responses.

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Bleeding from the SvO_2 monitoring port of PA catheter during cardiac surgery

To the Editor:

Although pulmonary artery (PA) catheter entrapment or failure is rare,¹ we report bleeding from the fiberoptic SvO_2 port of a PA catheter due to surgical suture following catheter displacement which disabled the continuous monitoring of SvO_2 during cardiopulmonary bypass.

After an 8 Fr balloon-tipped, flow-directed fiberoptic pulmonary artery catheter (OPTICATH™, model P7110-EP8-H, Abbott Laboratories) was connected to a saturation/cardiac output computer (Oximetrix™ 3 System, Abbott Laboratories), and *in vitro* calibration, the PA catheter was placed in a patient scheduled for

FIGURE 1 The slack PA catheter in the SVC. A, PA catheter; B, SVC cannula; C, inferior vena cava cannula; D, trachea; E, clavicle.

FIGURE 2 Distal portion of PA catheter after removal. A needle hole was situated at 26 cm from the catheter tip and communication with the extra-lumen of the catheter at 19 cm.

aortic valve replacement. Measurement of PA wedge pressure (PAWP) and continuous monitoring of SvO_2 were possible. For cardiopulmonary bypass, the surgeon inserted a 34 Fr superior vena cava (SVC) cannula, which was fixed to the right atrial (RA) wall using a double-armed surgical suture. Following cannulation, the configuration of the PA tracings changed to a right ventricular waveform and we could not obtain PAWP. We verified the slack of the PA catheter in the SVC under fluoroscopy (Figure 1). As soon as extracorporeal circulation was instituted, the saturation/cardiac output computer system displayed a light intensity signal alert. Fifteen minutes later, we noticed blood leaking around the connection at the optical module from the fiberoptic

SVO₂ port of the PA catheter. After repositioning the PA catheter, following aortic valve replacement, the fiberoptic continuous monitoring of SVO₂ was still impossible. We tried to exchange the PA catheter, but we could not withdraw it. However, the PA catheter could be withdrawn finally after removal of the SVC cannula and the purse string suture in the RA wall. We detected a small perforating hole at 26 cm from the PA catheter tip (Figure 2). A communication with the extra-lumen of the catheter, located 19 cm from the tip, was also demonstrated. It is advisable to ascertain that the PA catheter is freely mobile and its functions are not impaired before terminating cardiopulmonary bypass, since this simple manoeuvre may allow an early detection of this rare complication.

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Key issues in vaporizer filling

To the Editor:

We were interested to read the editorial¹ and correspondence^{2,3} relating to the critical overfilling of a vaporizer equipped with a keyed filler and the serious outcome associated with this error. This specific hazard was relayed to anaesthetists practising in the United Kingdom by the Department of Health.⁴

We believe it is now time for a comprehensive reappraisal of the current keyed filler design concept which dates back some 20 yr. Some of the problems associated with keyed fillers were listed in the editorial. Furthermore, their use is not associated with pollution-free vaporizer filling and filler port leakage has been reported during and after filling. Keyed fillers are expensive and prone to fatigue, although newer designs appear more durable. A further cost associated with their use is that of the inevitable wastage of residual anaesthetic, typically 2-3% in the case of isoflurane, remaining in "emptied" bottles, which occurs when keyed fillers are employed.^{5,6}

We recently surveyed 14 hospitals in one Health Re-

gion in the UK and found that 51% of the operating department personnel responsible for vaporizer filling experienced difficulties with vaporizers equipped with keyed fillers,⁷ some commenting that they found the procedure time consuming and "frustrating." Air locks resulting in slow filling or inability to fill were cited most commonly and several respondents volunteered "remedies" such as brief unscrewing of the bottle/filler connection and turning the vaporizer to the "On" position to overcome the inherent limitations of the keyed filler systems on the vaporizers they employed. This is clearly unsatisfactory and suggests that, despite clear warnings, another tragedy resulting from overfilling may be nearer than we think, particularly because agent-specific keyed vaporizers produced by several manufacturers are capable of being overfilled (personal communication [letter] E. Palayiwa, Nuffield Department of Anaesthetics, February 1994).

We propose the keyed filler system be abandoned in favour of a system allowing direct location of the bottle, complete with its collar, in a appropriately designed agent-specific vaporizer fill port. This has been previously described for conventional vaporizers⁸ and is a welcome design feature for the Ohmeda Tec 6 desflurane vaporizer.⁹ The current keyed filler system is inefficient and obsolete and cannot be redeemed by repeated costly design modifications prompted by further case reports reminding us, again, of the deficiencies associated with its use.

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