It is well known that a strong sympathetic stimulus will
shift blood volume from the systemic or high-pressure
to the pulmonary or low-pressure vascular bed.14
Thus, this patient may be thought of as having expe-
rienced a sudden increase in pulmonary blood
volume far larger than could have been produced by
any external transfusion. Both of these factors
together—not by no means a rare combination in situa-
tions of this type—account fully for the observed
fulminating pulmonary edema.

In conclusion, we report an unusual reaction to the
injection of 0.4 mg naloxone in a patient who had
received 136 mg morphine 11 hours earlier. The reac-
tion was a precipitous widespread activation of the
sympathetic nervous system, which induced pul-
monary edema in accordance with the history of the
patient and his hemodynamic status at the time of the
naloxone injection.

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Plastic Particulate Contaminants in the Medicine Cups of
Disposable Non-spinal Regional Anesthesia Sets

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The past several years have seen the increased use of
disposable regional anesthesia sets. The actual ad-
antage of these sets over reusable goods has not been
well documented. The disposable trays are convenient
to use, and most anesthesiologists feel confident in
the sterility and general cleanliness of the contained

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material. It is supposed that the cost of such
equipment is less than that of the reusable variety.
Previous reports1,4 have documented some problems
with disposable equipment. We have identified
another possible hazard in disposable epidural and
nerve block trays—that of particulate contaminants
in the medicine cups of the trays.

METHODS

The trays examined were selected at random from
the stock supplied us at our institution. Abbott
Epidural, Abbott Nerve Block, Pharmaseal Epidural,
and Travenol Epidural sets were included in the
series. The trays were opened as they would be in
clinical practice, except that surgical gloves were not
worn, to insure no particles of powder from the gloves
fell into the tray. In each tray, the cup designed to hold
the local anesthetic was removed, and its outside
carefully wiped with a damp sponge and inspected to
assure there were no particles still clinging to the outer surface. Each cup was then examined against a black background using direct and indirect light. The plastic particles, which were grossly visible clinging to the inside, were counted. The results are presented in table 1. The numbers of grossly visible particles present ranged from 26 to 42. Sizes varied widely, from long shavings of tray material to the more numerous smaller particles, apparently of the same material (figs. 1 and 2). In the Abbott Epidural set, the back pad designed to protect the catheter is packed in the medicine cup. Debris from it could be easily identified in the cups. In all cases, particles were adherent to the cups and could not be completely removed by dry wiping with the gauze sponge in the set or by tapping the inverted cup on a hard surface. In all cases, the particles could be observed floating in the anesthetic agent when it was added to the cups. We were able to draw grossly visible particles into a syringe through an 18-gauge needle.

**DISCUSSION**

Other problems with disposable regional anesthesia equipment have been documented. DiGiovanni has shown that mass-produced spinal needles may not have uniform styles and can introduce skin plugs into the underlying tissue. Eng has recently reported the breaking of a disposable introducer. There is some evidence to indicate possible toxicity of implanted plastic polymers. Oppenheimer has demonstrated an increased incidence of fibrosarcomas in rats in the area of implanted plastic polymers. Certainly, many plastics are capable of generating a foreign-body reaction. Should inadvertent subarachnoid or intravenous injection of the test dose of an epidural anesthetic occur, these particles could be deposited intrathecally or intravenously, respectively, with unknown consequences.

We have adopted the practice of not using the enclosed medicine cup in disposable epidural trays. Rather, we either draw the local anesthetic agent directly into the syringe it will be injected from, or add our own sterile glass or stainless steel medicine cup to the set.

In summary, we have identified plastic particulate contaminants in the medicine cups of disposable epidural and nerve block trays. We feel that the presence of these particles represents a possible hazard if they are injected with the anesthetic agent. This hazard is not associated with disposable spinal trays, because they do not contain medicine cups. Because of these findings, we suggest these medicine cups not be used, and that an alternate method of containing the local anesthetic agent be used.

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