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CURRENT ISSUES IN CENTRALISED INTRAVENOUS ADDITIVE SERVICES

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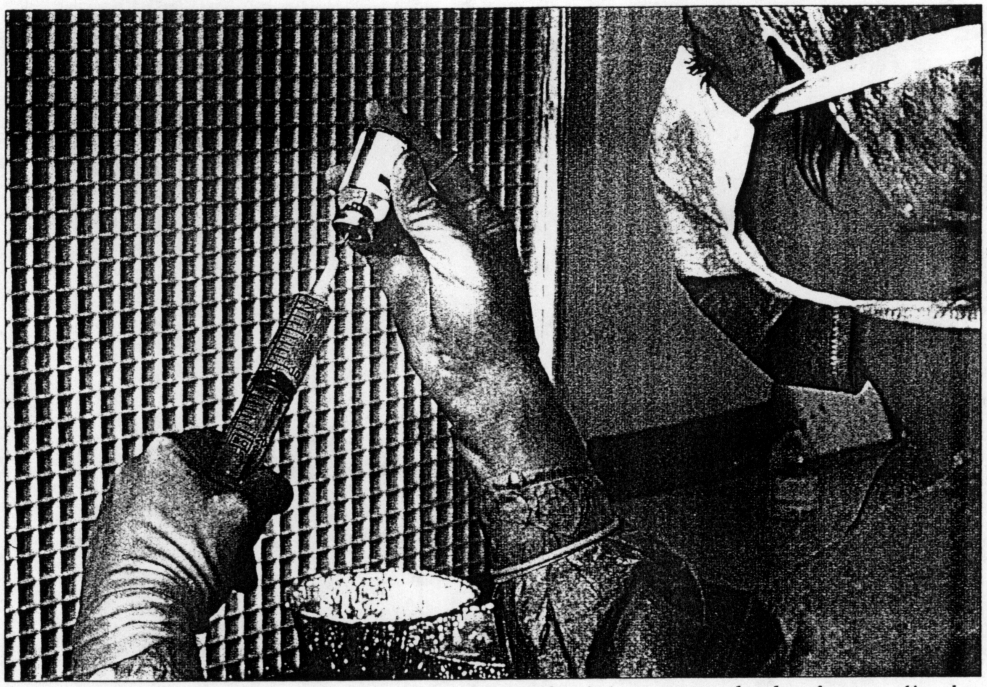

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Preparation of intravenous antibiotics: agreed minimum standards of centralised intravenous additive services must be attained by all units

CURRENT issues in centralised intravenous additive services (CIVAS) revolve around three related subjects; standards, risk and funding. There has been much attention given to standards of aseptic preparation recently, culminating in EL(97)52.[1] Substandard CIVA services cannot be condoned, and agreed minimum standards must be attained by all units, regardless of whether they produce 100 doses a day, or a year. However, within the finite budgetary limits of the National Health Service, standards set must be realistic rather than idealistic, and not require levels of investment that are disproportionate. CIVA services, along with all other health care specialties, should be included in a risk management evaluation process, so that the standards applied to the service are seen to be achievable in the wider health care context.

There has been a tendency to try to impose the regulatory requirements derived for large, industrial scale aseptic production onto CIVAS. For many reasons, this is inappropriate. The industrial operation is characterised by production of small numbers of large batches, whereas hospital CIVA production consists mostly of small, more numerous batches tailored to patients' needs. An example is the application of sterility testing to CIVAS, which, by applying the standard probability calculations,[2] can be shown to be of no value.

If centralised intravenous additive services are to thrive and continue to play a part in the quality care of patients, then the pharmacy profession must take a more appropriate and pragmatic attitude to the provision of these important services

Much of the validation undertaken in industrial operations is impractical in hospital services. Intuitively, this would suggest a lower level of assurance of product quality, but what evidence is there for this? In this era of evidence based practice, on what evidence is the seven-day expiry limit for unlicensed units based? The tragic events in Manchester,[3,4] which prompted the recent attention to aseptic unit standards, would probably have happened regardless of the seven-day expiry limit. Bearing in mind that it is not possible to guarantee the sterility of a product that is not terminally sterilised, would expiry policy not be better based on a risk analysis supported by appropriate validation data?

FORMAL ASSESSMENT

There are risks associated with almost all medical procedures, some of which have been documented in *Bandolier*.[5] However, there seems as yet to have been no formal risk assessment and no objective risk "target" for CIVAS work. There are risks associated with the preparation of CIVA doses, but what represents an "acceptable" level of risk? There is currently a debate as to whether cytotoxic drugs should be prepared in positive or negative pressure isolators. The advocates of positive pressure are arguing from the intuitive standpoint that there

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is likely to be less risk to the product, but there is no evidence to support this. Equally, there is little evidence to support the use of negative pressure on the grounds of operator safety, apart from observations that spread of contamination is better contained by a negative pressure environment. With the monitoring of exposure to cytotoxics being difficult and unreliable,[6] should a change from negative to positive pressure isolators be undertaken without a rigorous risk assessment from both operator and patient perspectives?

Many of the risks of medical procedures cannot be accurately quantified, but are balanced as objectively as possible against the benefits the procedure can bring. Preparation of medicines by nurses and physicians in clinical areas is not without risks. Clinical complications associated with anaesthetists drawing up and storing propofol injection in syringes before administration to a patient are well documented.[7,8] Similarly, medication errors have been reported regarding the preparation of injections by ward or clinic staff.[9] These are probably significantly under-reported. As it does for pharmacists, the Medicines Act 1968 controls the assembly of medicines by nurses and physicians. However, regulators appear pre-occupied by the medicine compounding activities of pharmacists under Section 10 of the Medicines Act. They have paid little attention to the risks of patient welfare occasioned by activities under Sections 9 and 11, the exemption clauses which allow the compounding of medicines by nurses and doctors, respectively, in the course of their professional duties.

MOVING FORWARD

How can CIVAS move forward? A pragmatic approach to improve patient safety could be to incorporate bacterial and pyrogen filters in infusion lines for susceptible patient groups. These filters can be readily validated for drug sorption, and work effectively over a wide pH range. They also provide protection against arguably the most significant infection risk from infusions, that is, multiple line manipulations by nursing or medical staff.[10] Use of the filter also reduces the frequency of such breaks, by extending the time between line changes to 96 hours. Such devices have been argued against in the past on the grounds that they could encourage complacency in aseptic techniques. This must surely be an outdated attitude in an age of objective risk management.

While striving for excellence in aseptic techniques, we should also be asking ourselves whether patient safety can further benefit from the use of bacterial and pyrogen retentive filters. The limited data currently available[11] suggest that it can, and properly designed and controlled randomised clinical studies need to be undertaken in defined patient groups, to provide support for this pragmatic approach.

There is currently a continuous "moving of the goal posts" in CIVAS unit standards, based not on fact or evidence of what is required, but simply on the availability of a new practice or technology. Those advising on, or setting, standards need to be aware of the current "near-patient" issues, and the realities of "hands-on" CIVAS work. Otherwise, there is the danger that resources will be taken away from other areas of patient care to upgrade the CIVAS without any quantifiable gain in patient safety or patient benefit. CIVA services need to take their place on the long list of risk management issues that confront all trust chief executives. Pharmacy staff need to research the relative errors and risks of injection preparation at ward and pharmacy level to support the risk assessment. There continues to be an acknowledgement at national level that a CIVA service is preferable to ward level injection preparation.[1] However, if CIVAS are to thrive and continue to play a part in the quality care of patients, then the profession, both regulators and practitioners alike, must take a more appropriate and pragmatic attitude to the provision of this important service.

REFERENCES

1. EL(97)52. Aseptic dispensing in National Health Service hospitals. London: NHS Executive, 1997.
2. The Pharmaceutical Codex (12th ed). London: Pharmaceutical Press, 1994:558.
3. Two children die after receiving infected TPN solutions. Pharm J 1994;252:596.
4. Accidental death verdict on children infected by TPN at a Manchester hospital. Ibid 1995;254:313.
5. Mad cows and Ecstasy: Chance and choice in an evidence based society. Bandolier 1996;3(8):5.
6. Baker ES, Connor TH. Monitoring occupational exposure to cancer chemotherapy drugs. Am J Health-Syst Pharm 1996;53:2713-23.
7. Bennett SN, McNeil MM, Bland LA, Arduino MJ, Villarino ME, Perrotta DM, *et al.* Postoperative infections traced to contamination of an intravenous anaesthetic, propofol. N Engl J Med 1995;333(3):147-53.
8. McHugh GJ, Roper GM. Propofol emulsion and bacterial contamination. Can J Anaesth 1995;42(9):801-4.
9. Cousins DH, Upton DR. How to prevent IV drug errors. Pharmacy in Practice 1997;7:310-2.
10. Quercia RA, Hills SW, Klimek JJ, McLaughlin JC, Nightingale CH, Drezner AD, *et al.* Bacteriologic contamination of intravenous infusion delivery systems in an intensive care unit. Am J Med 1986;80:364-68.
11. Van Lingen RA, Baerts W, Marquering A, Ruijs GJHM. ELD 96 particle filters in sick newborn infants result in significantly fewer infectious complications at lower cost. J Clin Microbiol Infect 1997;3(52):122.