**Background and Objective**

Medical errors are one of the leading causes of death in the hospital environment. Amongst them, drug administration is in the forefront: analgesics being the primary drugs involved. When using patient-controlled analgesia (PCA) devices for post operative pain management, several types of drugs are administered: local anaesthetics (LA) such as bupivacaine for continuous nerve block, LA with opiates for epidural injection or morphine for intravenous analgesia. Bupivacaine is a standard in obstetric epidural block or post-operative analgesia and it has been shown that the addition of a liposoluble opiate such as fentanyl at 2 mcg/ml improves analgesic quality. Until recently these complex solutions were prepared extemporaneously, either by anaesthesiologists or nursing staff in the operating theatre or recovery room, or by pharmacy-based centralised intravenous additive (CIVA) services using aseptic techniques. The aim of this study was to develop ready-to-use solutions of morphine as well as bupivacaine with fentanyl at an industrial level using steam sterilisation if possible, and with a long shelf life.

**Methods**

Discussions between the Pharmacy, the Department of Anaesthesiology HUG and a Swiss pharmaceutical company led to the manufacture of a morphine solution 100mg/100ml for PCA, and bupivacaine 0.125% with fentanyl 0.0002% (250ml) in polypropylene infus bags (Bioren) for use in both general and obstetric surgery. The bags were filled with the solutions at 80°C using a semi-automatic filling machine and sterilised at 121°C for 20 minutes. Stability tests were then carried out at room temperature (RT): 25 ± 2 °C with a relative humidity (RH) of 60 ± 5%, an accelerated test at 30 ± 2 °C with an RH of 60 ± 5% (AT1) and another at 40 ± 2 °C with 75% ± 5% RH (AT2) using HPLC analytical methods.

**Results**

The results show that the finished products are stable after 9 months at RT and 6 months at AT1 and AT2. The ultimate goal is for a shelf life of 3 years. Both preparations will be submitted to the Swiss health authorities for registration at the end of 2002.

**Conclusions**

Ready-to-use solutions facilitate prescribing due to: standard doses, reduced manipulation, diminished potential errors (under- or overdose), ease of use, gain in time, low risk of contamination during preparation, significant cost savings and ultimately more prescriptions which is an advantage for the patient. These preparations have already been beneficial to 70% of the patients in confinement at the HUG maternity. In the field results, after several months use, showed that a return to traditional methods would be felt as a step backwards by both the anaesthesiologists and the nursing staff of the HUG. The collaboration between the departments of pharmacy and anaesthesiology and the pharmaceutical industry has resulted in stable solutions with improved quality and safety for epidural injection and post operative analgesia.

**References**


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**HUG**

Hôpitaux Universitaires de Genève

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