Stability study of an epidural analgesic concentrate for infusion used during childbirth

R.H. Svendsen[1], M. Solås[1], T.S. Dogbeten[1], S.M. Fischer[1].
[1]Hospital Pharmacy Oslo Rikshospitalet, Hospital Pharmacies Enterprise, South Eastern Norway, Oslo, Norway
rahamr@sahf.no

BACKGROUND

Infusions for epidural analgesia are frequently used in maternity wards to ease pain during childbirth. A standardized concentrate for infusion containing bupivacaine, fentanyl and adrenaline used for general epidural analgesia is produced at the Hospital Pharmacy (1) and diluted in infusion bags by an external compounding unit.

Recently, a maternity ward asked the Hospital Pharmacy to prepare a concentrate for infusion more suitable for their patients containing only bupivacaine (in a reduced concentration) and fentanyl, reducing the need for in-house compounded alternatives.

Figure 1. A vial of the epidural analgesic

AIM AND OBJECTIVE

To confirm the long-term stability of the newer, more suitable concentrate for infusion through an on-going stability study

MATERIALS AND METHODS

- The concentrate was filled in 50 ml vials and stored at 5°C ± 3°C, protected from light.
- Samples were assayed by UHPLC as previously described elsewhere (1), and pH and conductivity were measured.
- The analytical method is validated for linearity, precision, and specificity.
- Sterility was tested according to Ph.Eur. 2.6.1.

RESULTS

Chemical and microbiological test results during the stability study are summarized in Table 1 and Figure 2.

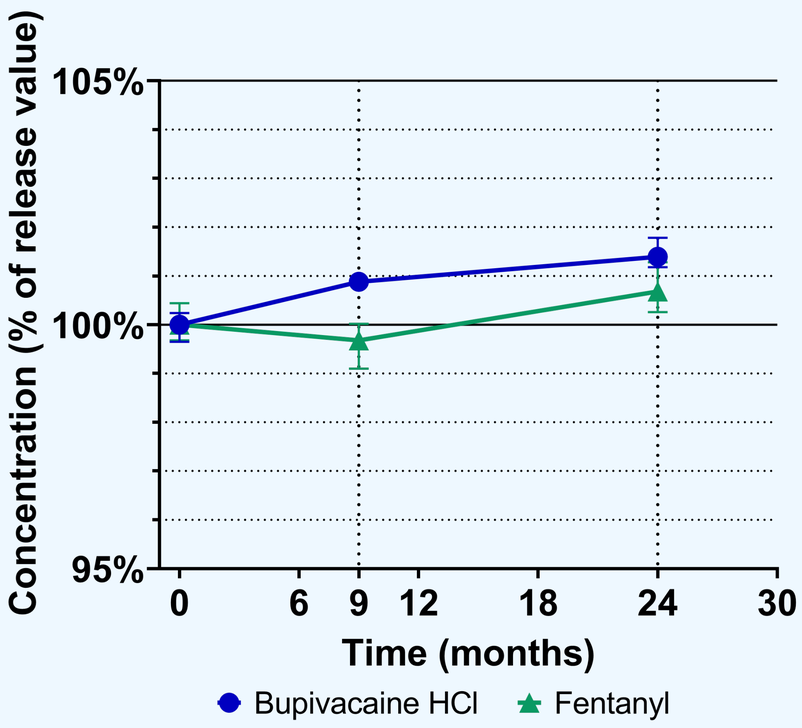

Figure 2. Measured concentration (% of release value, mean ± min-max) of bupivacaine hydrochloride and fentanyl in the concentrate for infusion after storage for 0, 9 and 24 months.

Table 1. Results of Chemical (mean ± SD, n=3) and microbiological tests during the stability study.

Test	Release	9 months	24 months
pH	4.03 (±0.02)	4.14 (±0.01)	4.14 (±0.01)
Conductivity (mS/cm)	1.696 (±0.001)	1.698 (±0.000)	1.711 (±0.002)
Sterility	No growth	No growth	NA

CONCLUSION

The concentrate for infusion was found stable in terms of drug concentration, conductivity, and sterility. There was a slight increase in pH over time, insignificant to overall stability.

Based on the current data, it could be concluded that removing adrenaline from the formulation did not decrease stability, and the shelf life could be set to 9 months similar to the older formulation. Furthermore, the study showed that it might be possible to extend the shelf life to 24 months.

Providing the hospital with a ready-to-use product adapted to their needs saves the hospital costs, time, and resources, while increasing quality and patient safety.

REFERENCES

1. Brustugun J, Troland S, Breivik H. *The stability of a sulphite-free epidural analgesic solution containing fentanyl, bupivacaine, and adrenaline*. Acta anaesthesiologica Scandinavica. 2013;57(10):1321–1327

The Hospital Pharmacies Enterprise
South Eastern Norway Regional Health Authority