Hypotension on haemodialysis from an error of excessive ultrafiltration setting

A patient (79 year old male) was undergoing haemodialysis. The prescribed ultrafiltration volume was intended to be 600mls but in error 6000mls was entered into the dialysis machine. This was not recognised until 4800mls had been removed by which time the patient was in peri-arrest with a BP of 50 systolic. The patient recovered but the incident was classified as exposing the patient to severe harm. The following contributory factors were identified by the trust:

**Individual Factors**
The nurse was trained to use the machine, but felt less confident using this machine. A junior nurse was acting as the shift co-ordinator but the nurse involved in the incident felt she needed to supervise the junior nurse and keep an eye on what was happening on the ward.

**Task Factors**
The haemodialysis machine was set up by the nurse involved in the incident, but the machine was not second checked which was contrary to local guidelines. The blood pressure was not monitored during dialysis as per local guidelines.

**Education and Training Factors**
Competency is recorded and the record held by individual staff members; however the nurse concerned had not had her competency assessment completed. The nurse was trained to use this haemodialysis machine but then worked in clinic for 4 months and returned to the dialysis unit approx 6 months prior to incident

**Equipment and Resource Factors**
Two different haemodialysis machines were both used on the unit. The choice of haemodialysis machine is influenced by availability and users preference.
Recommendations made by the trust
1) Haemodialysis machine checklist to be introduced into inpatient areas
2) “Quirks” with machines to feature in the troubleshooting section of machine competencies
3) Practice development team to identify criteria to be used when training and assessing staff
4) Responsibility for assessing competency with new equipment to fall within the practice development teams remit

Conclusion
The reason for the error is multi-factorial due to poor machine design, incorrect programming and failure to perform second check and adequate monitoring of patient as per local guideline.

Key Learning Point
The machine involved in this incident has a 4 digit entry field which enters digits from left to right for the ultrafiltration (UF) volume. For UF volumes less than 1000mls, a leading zero needs to be entered ie. 0600mls. In this case the leading zero was not entered, the first digit the nurse entered was 6 which led to a UF volume of 6000mls. The NPSA is in discussion with the MHRA about the machine design problem identified.

Please submit comments, solutions, and personal experience of similar incidents to:

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