learning and to provide a training log.

It was important to gain the respect and confidence of the referring doctors. This meant having a good knowledge of the range of devices, pre- and post-procedure and follow-up care, as well as patient conditions.

The following areas of training were identified as essential for safe TCVC insertion:

- Competence in aseptic technique;
- Attendance at resuscitation courses at regular intervals defined by service protocol;
- Knowledge of the complications and fail-safe procedures to prevent them;
- Training in basic radiation protection;
- Ultrasound-guided jugular puncture and the ability to differentiate between structures (particularly veins and arteries);
- Knowledge of normal anatomy to conduct examinations and tell normal from abnormal;
- X-ray interpretation of tip position;
- Adequate blood results before procedures;
- Critical thinking, diagnostic reasoning skills and clinical decision-making (including the initiation of emergency procedures);
- Promoting the implementation of evidence-based practice throughout assessment, diagnosis, treatment and discharge/referral;
- Ability to treat patients within the inclusion criteria without medical staff being present.

Specialist nurses were supervised by the consultant or lead nurse for at least 20 TCVC placements, and explicitly informed when they were considered competent. If the lead nurse or interventional radiologist felt an individual was not competent, the right to perform placements was withheld and further training provided.

### BOX 2. EXCLUSION CRITERIA

- Pleural effusion
- Pneumothorax
- Consolidation of the lung
- Tracheotomy
- Neutrophils lower than 0.7 X 10⁹/L
- Platelet counts lower than 40 X 10⁹/L
- International normalised ratio over 1.5
- Neck lymph nodes enlarged
- Supra-ventricular tachycardia
- Pacing wires in situ
- Fixed neck
- Uncontrollable cough
- Previous thorosynthesis
- Children under the age of 16

**CONCLUSION**

The service now consists of a lead nurse, four clinical nurse specialists and two healthcare support workers. Referrals are received from medical staff or nurse practitioners. Patients who fall within our exclusion criteria (Box 2) are discussed with medical staff who make themselves available while nurses carry out the procedure, or add them to their own lists.

We now have no waiting list for Hickman line insertion but, because we have only six radiology slots per week for renal dialysis catheter insertion, patients needing these can wait 7–14 days. Urgent requests, however, are dealt with on the same day if possible.

The nurses discuss the procedure and potential complications and aftercare of the catheters with patients, and obtain consent before the procedure. Each patient is given a detailed information leaflet, with contact numbers and advice on complications or queries. Complication rates are low.

Training for the procedure is available on site and nurses have reported increased job satisfaction.

This scheme has proved extremely beneficial: waiting times have reduced and questionnaires have suggested patients are very satisfied.

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**REFERENCES**


