

Peripheral Inserted Central Catheter (PICC)-related Complications in an Orthopaedic Hospital

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BACKGROUND

Peripheral inserted central catheters (PICCs) are non-tunnelled vascular access devices which are usually inserted into the deep veins of the upper limb. PICCs are easy to insert, safe to use and are thought to have a lower risk of infection compared to central venous catheters.

At the Royal National Orthopaedic Hospital in Stanmore, London, there is a central venous access service. Other than a dedicated weekly half-day theatre session, five anaesthetic consultants are available to insert and manage PICCs during routine working hours. Most PICCs at our hospital are inserted for the medium- to long-term treatment of infection. Our aim was to examine the complication rate associated with PICCs inserted for parenteral antimicrobial administration.



Figure 1: Illustration of a Vygon PICC

METHODS

Between 1st April 2013 and 29th August 2015, a clinical nurse specialist followed up all patients on a prospective basis. Follow up consisted of a weekly telephone call where routine questions were asked and concerns were addressed and a six-weekly face-to-face clinic appointment. Patients were encouraged to contact us if there were any further problems.

RESULTS

Most common indications for PICC insertion were prosthetic joint infection (76%), spinal infection (6%) and osteomyelitis (6%). 48% of the patients were male while 52% were female. The average age was 59 (range 11-84). In total, 387 PICCs were inserted and the overall complication rate was 14.2% and 3.23 per 1000 PICC days. On average the incidence of symptomatic upper extremity venous thrombosis (UEVT) and infection were 1.03% and 1.29% respectively. The rate of migration demonstrated a progressive decline from 4.4% in 2013-14 to 2.6% in 2015. In a similar fashion the rate of occlusion decreased from 10.69% to 2.6% over this same time period.

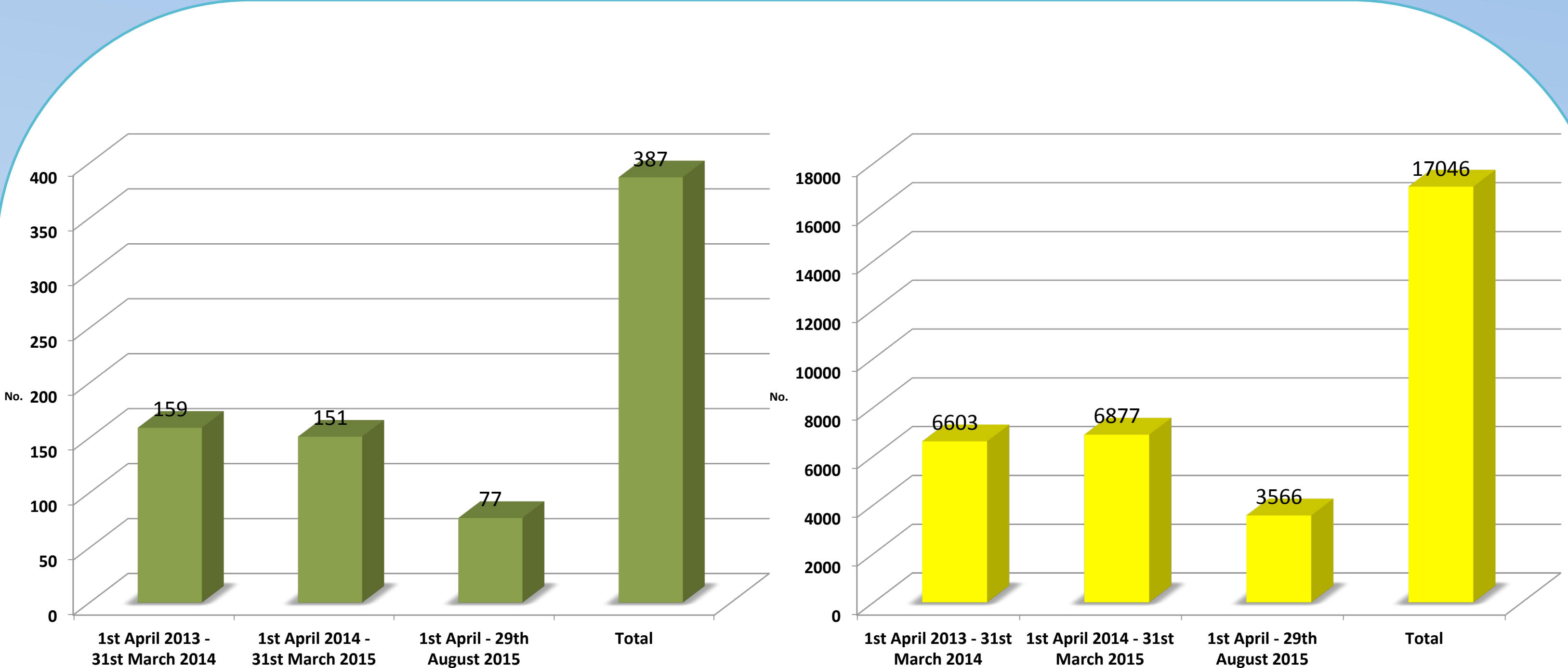


Figure 2: Number of PICCs inserted

Figure 3: Number of PICC days

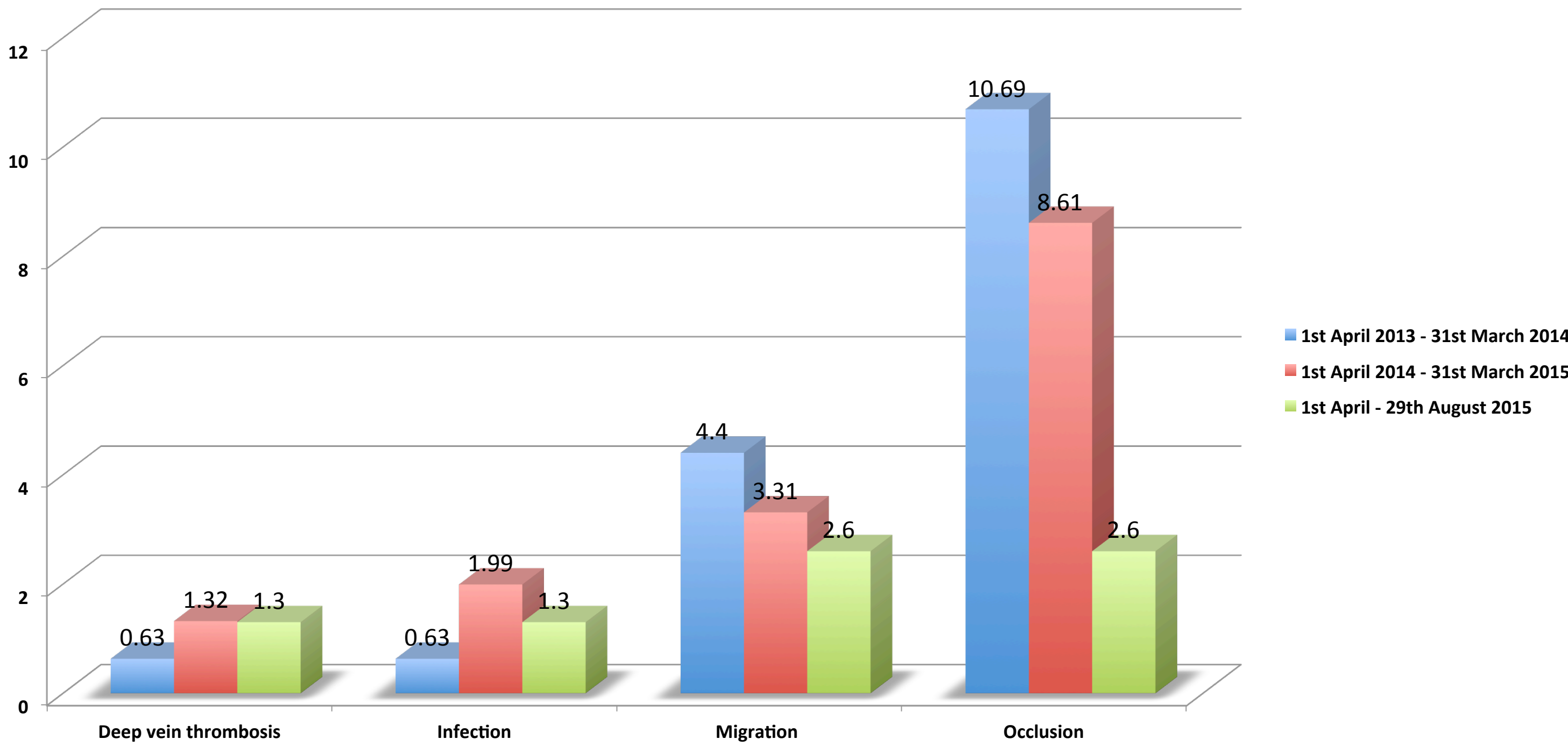


Figure 4: Complication rates of PICCs



Figure 5: Curo Port Protectors

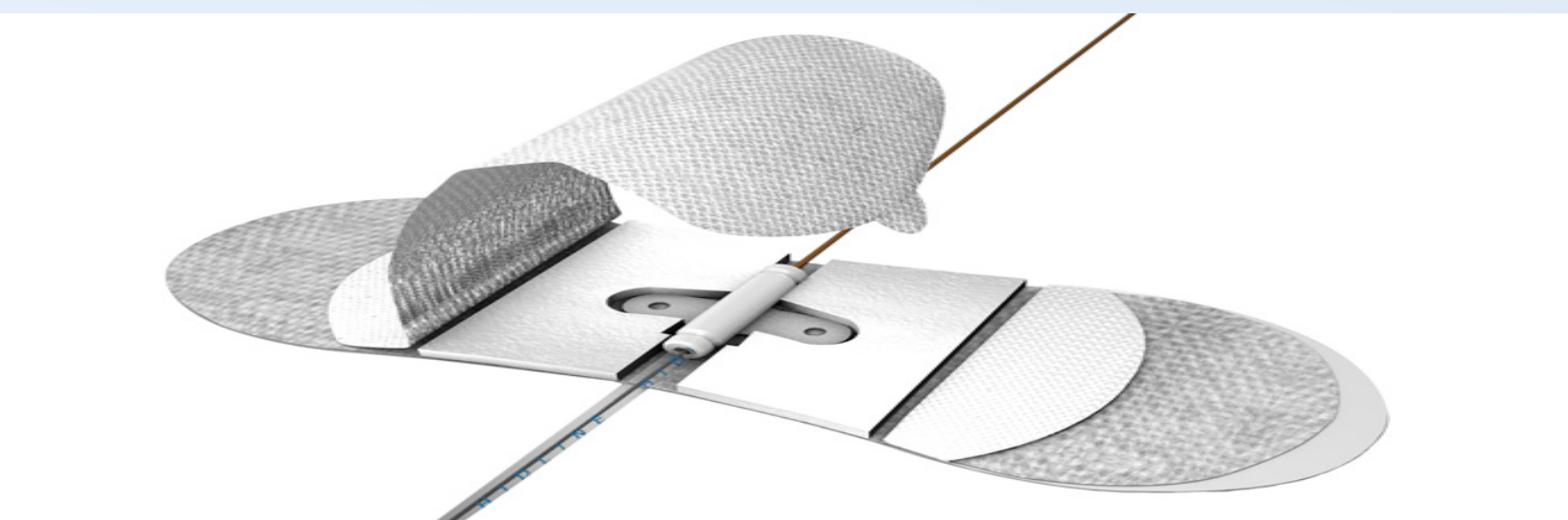


Figure 6: Vygon Grip-Lok

DISCUSSION

Our complication rate of 3.23 per 1000 PICC days was almost threefold lower than that reported from a retrospective study which evaluated PICCs in patients with bone infection who required long-term antibiotics [1]. It is unlikely that we missed complications as patients were meticulously followed up but it is possible.

Incidence of symptomatic UEVT was lower than the incidence of 3-20% described in the literature [2]. It is possible that this is because we use single lumen and smaller 4Fr calibre PICCs which are associated with a reduced thrombosis risk. Infection rates were extremely low when compared to a previous study which demonstrated an infection rate of 15% [1]. Our low infection rates may be at least partially secondary to strict aseptic insertion under ultrasound guidance in the theatre environment, the use of Curo Port Protectors which are a passive continuous disinfection device and patient education about PICC handling. Both the rates of migration and occlusion have decreased dramatically over time. It may be that immediate use after fluoroscopic confirmation of position, the change from the STATLOCK stabilisation device to the Vygon Grip-Lok, the use of patient information and troubleshooting booklets as well as close patient follow-up have contributed to this decline.

We are soon to trial the Vygon Bionector TKO which reduces the reflux of blood into the catheter and we will then evaluate the effect this introduction has on our rates of occlusion. In view of these low complication rates we recommend our PICC bundle to be examined and followed as a standard of care.

OUR RECOMMENDED PICC BUNDLE TO REDUCE COMPLICATIONS

- Multi-disciplinary team with consultant and specialised nurse input
- Strict asepsis in the theatre environment
- Ultrasound guided insertion at the mid-arm level
- Single lumen and small calibre 4Fr PICC line
- Immediate confirmation of position with fluoroscopy
- Curo Port Protector
- Vygon Grip-Lok
- Meticulous follow up: telephone and face to face
- Patient education and information & troubleshooting booklet

REFERENCES

- Valbousquet Schneider L, Duron S, Arnaud F *et al*. Evaluation of PICC complications in orthopedic inpatients with bone infection for long-term intravenous antibiotics therapy. *Journal of Vascular Access*. 2015; 16; 299-308.
- Zochios V, Umar I, Simpson N, Jones N. Peripherally inserted central catheter (PICC)-related thrombosis in critically ill patients. *Journal of Vascular Access*. 2014; 15: 329-37.