

# Hematology and Oncology

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## PICCs & Central Line Associated Blood Stream Infections in Aneurin Bevan Health Board

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Peripherally inserted central catheters (PICCs) are specialised venous catheters made of strong, flexible, radio-opaque material such as polyurethane or silicone. They terminate in the distal superior vena cava and provide reliable venous access for the delivery of a broad range of intravenous agents; they also allow blood to be safely drawn for laboratory testing. The popularity of PICCs has grown in contemporary medical practice for numerous reasons such as relative cost-effectiveness, perceived safety and ease of insertion. They have taken over from traditional central venous catheters (CVCs) which are inserted by directly puncturing one of the great veins at the upper thoracic aperture. Central line-associated blood stream infection (CLABSI) is one of the major potential complications among all CVCs, particularly among critically ill or immunocompromised patients. This quality improvement project aims to review CLABSI rates in PICC lines inserted in The Royal Gwent Hospital & implement interventions to reduce the rate of infection. A retrospective data collection was carried out identifying all patients who had received a PICC line in the year running January to January 2016-2017. This period was chosen because it was the first year in which more than 50 PICCs were inserted by the Radiologists and it was felt that a sample size of less than 50 could provide inadequate or biased data. 54 patients from the Radiology database and 54 patients from the Haematology database were randomly selected and comprehensive data was extracted from CWS, RADEX and patient notes. Interventions were then implemented including updating guidelines for PICC care on the intranet, producing a proforma for use in patient's notes and organising teaching at Foundation Doctor weekly sessions as well as on the wards. Data was then collected again to assess the effect of the interventions and run-charts were produced to demonstrate significance. Results Four lines in the initial data collection fulfilled the criteria for CLABSI. Three of these infections were for PICC lines from the Haematology arm and one was from a PICC line from the Radiology arm. Since PICCs are present for a varying duration in different patients, expressing the risk of CLABSI per 1,000 line days rather than per 100 PICCs allows

for a more meaningful estimation of risk. The overall rate of infection was 0.92 infections per 1,000 line days with a rate of 1.05 infections per 1,000 line days in the Haematology arm and 0.67 infections per 1,000 line days in the Radiology arm. The subsequent data collection demonstrated an overall rate of infection of 0.76 infections per 1,000 line days with a rate of 0.94 infections per 1,000 line days in the Haematology arm and 0.45 infections per 1,000 line days in the Radiology arm. Discussion In both The Radiology Suite and Medical Day Case Unit, the rate of proven CLABSI is <1.2 per 1,000 line days which is far superior to the average quoted in the literature of 2.1 per 1,000 line days (3) in hospitalised patients. However, as the data was gathered it became apparent that there were multiple PICC lines which were removed for suspicion of infection in which the line was not sent for culture. Therefore, the apparently favourable rates of line infection at RGH may merely be an anomaly due to poor practice with regards to microbiological protocol. All lines which are removed for suspicion of CLABSI must be sent to microbiology for line-tip culture, along with a simultaneous blood culture ideally taken prior to line removal. It is prudent to note that if there is no demonstrable advantages in terms of outcomes when placing PICC lines in Interventional Radiology Suites then the procedure could simply be completed at the bedside by specially trained nurses. However, the data collected through this project showed that there were significantly fewer infections per 1,000 lines days when PICC lines were placed in The Radiology Suite. While this may justify the extra cost involved, it may simply reflect the different subgroups of the population admitted into the two different services. The majority of patients undergoing PICC line insertion in Medical Day Case Unit require long-term chemotherapy and are therefore more susceptible to CLABSI. In addition, patients who are frailer, hospitalised, more elderly or suffering from concurrent infections are more likely to contract CLABSI. The overall average time until infection was 57 days with the longest time until infection being 134 days and the shortest being 11 days. An early infection (within two weeks) would suggest that it was procedure-related.

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