

**#3645**

## **The Management Of Warfarin Reversal For Fractured Neck Of Femur Patients Requiring Acute Surgery: A Matched Cohort Study**

**Thomas Steven Moores**, Alastair Beaven, Benjamin Dougal Chatterton, Philip John Roberts

University Hospital of North Staffordshire, Stoke On Trent, United Kingdom

keywords:Cohort Study, Warfarin Reversal, Hip Fracture, Outcomes

**Introduction:** Hip fracture is the commonest reason for orthopaedic admission. Early surgical intervention significantly decreases morbidity and mortality. 3.2% of hip fracture patients are taking warfarin on admission, a potential cause of delay in surgery. The 2010 Best Practice Tariff (BPT) offers financial rewards for the best treatment of hip fractures, including surgery within 36 hours of admission. The 2011 National Institute for Health and Care Excellence (NICE) hip fracture guidelines also recommend surgery within 48 hours of admission.

**Objectives:** To review outcomes and the management of warfarin reversal in hip fracture patients admitted on warfarin with non-warfarinised patients, before and after the introduction of BPT and NICE guidelines. This project was undertaken as a service evaluation with local approval granted.

**Methods:** A retrospective matched cohort study was performed at a level 1 trauma centre. All warfarinised patients with a proximal femoral fracture admitted between February 2008 and October 2009 constituted the pre-national guideline group, and between May 2010 and February 2012 constituted the post-national guideline group. Non-warfarinised control groups were age and sex matched. Those admitted on warfarin in the 2008-9 were treated with no standardized warfarin reversal protocol, whereas those admitted in 2010-12 received a locally devised protocol of 2mg intravenous Vitamin K 6 hourly from admission until the INR was below 1.7, a locally accepted safe level for surgery and spinal anaesthesia. Outcomes assessed included time to INR <1.7, time to theatre, length of stay, and 30 day and one year mortality.

**Results:** 2008-2009: Forty-one patients were admitted with a hip fracture on warfarin, (mean age 79.7 ( $\pm$ 7.6), F:M 3:1). Their mean time to theatre was 3.2 ( $\pm$ 2.6) days, compared with 2.0 ( $\pm$ 1.7) days in controls ( $p$ <0.05). Although the 48-hour NICE guideline was not introduced at this time, only 39% of those taking warfarin would have met this target, compared to 74% of controls. Mean length of stay was 16.5 ( $\pm$ 13.4) days for warfarinised patients, compared to 14.4 ( $\pm$ 11.6) days for controls. 30-day and 1-year mortality for warfarinised patients was 15% and 42% respectively.

2010-2012: Forty-eight patients were admitted with a hip fracture on warfarin (mean age 81.2 years, F:M 3:1). All received the standardized reversal protocol, and all had an INR of <1.7 within 24 hours of admission. Seventy-seven percent had surgery within 48 hours of admission, with no delays due to a high INR. Eighty-six percent of the control group had surgery within 48 hours. For warfarinised patients, mean length of stay was 11.4 days ( $\pm$ 9.2), and the 30-day and 1-year mortality was 8% and 33% respectively.

The mean time to theatre was significantly reduced ( $p$ <0.05) after the introduction of the reversal protocol for patients admitted on warfarin. There was also a reduction in mean length of stay for warfarinised patients following the protocol's introduction from 16.5 ( $\pm$ 13.4) to 11.4 days ( $\pm$ 9.2), but this did not reach statistical significance. Mortality rates were improved at 30 days and 1 year but this difference was not statistically significant.

**Conclusions:** Titrated IV low dose vitamin K effectively reduces INR to a safe operative level within 24 hours and improves time to theatre, reduces length of stay and generally improves 30 day and 1 year mortality rates. The introduction of national guidelines has improved standards of care for all hip fracture patients. Preoperative medical optimization to safely achieve early surgery, including anticoagulation reversal, improves outcome.