

Hypothermia Causing Multi System Complications In Elderly Patient with Femur Neck Fracture

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Dr Housameddin Ghazzawi MBBCh. MSc. Diploma (1), Dr Lynne Barr MBBS. MA. (2), Dr Mohammed Ghallab MBBCh (3), Dr Ivan Walton BMBCh, FRCP (4), Mr Rhidian Thomas BSc MS FRCSEd (Orth) (5). Charing Cross Hospital, Fulham Palace Road, London W6 8RF. 1- Research Fellow, Trauma and Orthopaedics. 2- Senior House Officer, Trauma and Orthopaedics. 3- Senior House Officer, Trauma and Orthopaedics. 4- Consultant, Elderly Medicine. 5- Consultant, Trauma and Orthopaedics.

We report a case of hypothermia and co-morbidities following a fractured neck of femur. This article reviews the literature on hypothermia in the elderly following trauma and the associated pathology. We discuss the current management of these medical complications.

Key points:

- The elderly are more susceptible to hypothermia.
- Hypothermia can cause multi system problems.
- 3.6% of elderly admissions (aged over 65years) are hypothermic.
- Hypothermia must always be considered in elderly patients.
- Delay of surgery for fracture neck of femur due to medical problems increases mortality.

Introduction:

We report a case of hypothermia, following fractured neck of femur, which led to renal impairment, metabolic acidosis and myocardial infarction. Following appropriate resuscitative measures, the patient was medically stable to undergo a right hip Hemiarthroplasty three days after admission.

This case highlights the fact that the elderly population have an increased risk of succumbing to hypothermia and its subsequent complications. This can be a particular problem were a co-existing major surgical procedure is also required.

History:

An 85-year-old female was brought to the Emergency Department having been found by her daughter on the floor at home. She had probably fallen at least sixteen hours previously. On admission, she was conscious but confused (GCS 14/15), partially undressed and complaining of pain in the right hip.

Vital signs showed systolic BP 80, pulse 50 and core rectal temperature 31.5°C.

Resuscitative measures were commenced with warmed intravenous (IV) fluids and external warming using a 'Bair hugger' as per Advanced Life Support (ALS) guidelines. Radiographs showed a right intracapsular fractured neck of femur (NOF). Initial blood investigations, including Arterial Blood Gas (ABG), showed raised CRP, acute renal impairment and metabolic acidosis (pH 7.17, bicarbonate 12.9). Repeat ABG after one hour did not show any significant improvement and it was decided to give 50 ml 8.4% bicarbonate. Following initial resuscitation, BP was 104/60, ABG showed pH 7.42 and bicarbonate 23.4. Treatment was commenced with IV Augmentin to cover chest infection in light of the raised CRP and coarse crepitations at the left lung base on auscultation.

The morning following admission, the patient's blood pressure again dropped, respiratory rate increased, urine output was 4ml/hr and there were bilateral crepitations to the mid-zones. Chest radiograph, however, did not show any evidence of pulmonary edema. Resuscitative fluid treatment was therefore continued with gelofusin and 4 units of blood transfused providing a satisfactory response. Electrocardiogram (ECG) at this time showed Antero-lateral T wave inversion and inferior Q waves. Non ST-elevation myocardial infarction (NSTEMI) was confirmed by raised 12 hour Troponin I. In light of the patient's acute renal failure this was treated with aspirin alone. The following day she had a run of ventricular tachycardia (VT) which self-terminated after 6 beats.

Following the above management regime, the patient was deemed fit enough to undergo a right hemiarthroplasty three days following admission. There were no further medical problems during the post-operative period. At four months following admission, she is independently mobilising with the aid of a walker.

Figure 1: Pre and post-op pelvic radiographs showing fractured right neck of femur fracture.

Discussion:

Hypothermia is a clinical state in which the core body temperature is below 35.0°C.

Elderly people are more susceptible to hypothermia for various reasons, including impaired thermoregulation with increased age (Horvath and Rochelle, 1977), co-morbidities and medications (Kramer et al, 1989), and under nourishment (Bastow et al, 1983).

Temperature homeostasis is essential for the normal function of all body systems. It follows that derangement of this homeostasis by either hypo- or hyperthermia will lead to increased morbidity and mortality, particularly in the elderly. The most frequent sequelae of hypothermia include metabolic acidosis, increased blood viscosity, cognitive dysfunction, acute pancreatitis, and renal and hepatic failure (Knobel et al, 2001). In a large UK study, 3.6% of all elderly hospital admissions (aged over 65 years) were hypothermic. The mortality rate of those whose admission temperature was 30-34.9°C was 39% (Goldman, 1977). According to the POSSUM scoring system (Copeland, 1991) (which does not incorporate body temperature) our patient's mortality was predicted as 31%. The mortality rate for female fractured neck of femur patients in the 85-89 years age group is 10.5% at 30 days and 20.1% at 90 days after hospital admission for the index fracture (Robert and Goldacre, 2003). A recent study reports that patients with medical co morbidities significant to delay surgery for fractured neck of femur have 2.5 times increased risk of death at 30 days compared to patients without co-morbidities that delayed surgery (Moran et al, 2005).

Conclusion:

Hypothermia, particularly in the elderly patient, can have detrimental effects on multiple organ systems, as illustrated by the above case.

It is therefore of paramount importance that hypothermia is always considered in elderly fractured neck of femur patients, and that they are fully assessed and optimised before undergoing surgery.

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