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# ARE ALBUMIN LEVELS A GOOD PREDICTOR OF MORTALITY IN ELDERLY PATIENTS WITH NECK OF FEMUR FRACTURES?

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## INTRODUCTION

- Neck of femur fractures are associated with significant morbidity and mortality. The National Hip Fracture database in England suggest an 8.2% 30 day mortality.
- Suggested mortality predictors include: The Nottingham Hip Score, POSSUM score, Lactate, End Tidal CO<sub>2</sub>, Total Lymphocyte Count and Albumin. Predictors of short-term mortality may be a useful healthcare tool in these patients.
- Hypoalbuminaemia is determined as a level less than 35g/dl. No classification for degree of hypoalbuminaemia exists. It's clinical significance are associated with liver/renal failure, chronic illness and poor nutritional states.
- We wanted to assess whether there is an association between hypoalbuminaemia and patient survival, if the severity affected outcomes and whether highlighting those patients with hypoalbuminaemia would be a useful prognostic tool.

## MATERIALS & METHODS

- Retrospective study was performed taking data obtained from local databases between January 2011 to December 2012. Study curtailment was 31<sup>st</sup> July 2014.
- Data included all patients over 65 years of age presenting with a neck of femur fracture and a serum albumin pre-operatively
- Variables assessed included gender, age at fracture, time to surgery, pre-operative ambulation level, ASA grade, pre-operative albumin levels and length of hospital stay.
- We classified hypoalbuminaemia as Mild (25-34 g/dl), Moderate (15-24 g/dl) and Severe: (<15 g/dl). (Given the low frequency of patients in severe group, this was combined with moderate group).
- Parametric survival analysis was performed using Stata/IC Version 11.

## RESULTS

- 471 patients were included.142 males (30.2%) and 329 females (69.8%).
- The mean pre-operative albumin level amongst patients who had died during the study period was 29.5 g/dl (SD 6.22 g/dl).
- The mean pre-operative albumin level amongst patients who did not die during the study period was 32.8 g/dl (SD 6.43 g/dl).
- Survival analysis with all variables entered demonstrated Pre-operative albumin level to be significantly associated with survival (hazard ratio (HR) 0.957: 95% confidence interval for HR: (0.937, 0.978); p<0.001).

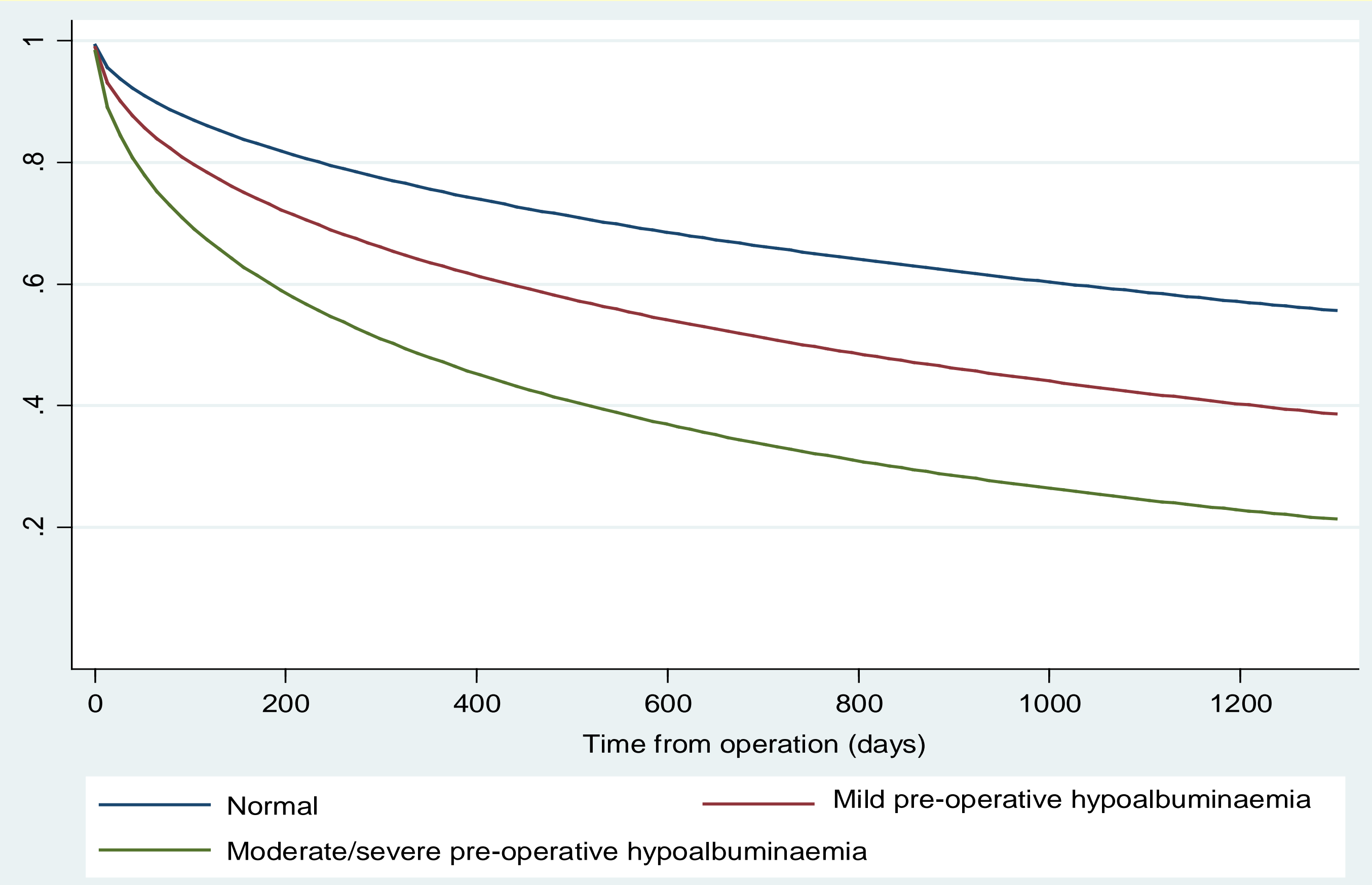
**Hence, each reduction of 1 g/dl in pre-operative albumin is associated with an increased hazard of death of 4.3% at best estimate, and controlling for other variables.**

- Amongst the controlling variables, gender, age at fracture and ASA score were also significantly associated with raised hazards, with greater hazard of death being found in males, in older patients and patients with higher ASA scores (p<0.001).
- For the entire sample the Median survival time is 929 days. [95% CI (644, 1143)]
- In patients with Moderate/Severe albumin levels: Median survival is about 300 days.
- In patients with Mild albumin levels Median survival is about 750 days.
- In patients with Normal albumin levels Median survival in excess of 1200 days.
- In all patients, a rapid early reduction in survival is experienced, followed by a levelling off beyond about 600 days. (Figure 1)

Table 1: Albumin level and relation to mortality

Albumin g/dl	Normal	Mild	Moderate/ Severe	Total
Died	51 (33.6%)	134 (55.8%)	54 (68.4%)	239 (50.7%)
Alive	101 (76.4%)	106 (44.2%)	25 (31.6%)	232 (49.3%)
Total	152	240	79	471

Figure 1: Survival experience of patients – normal, mild and moderate/severe albumin levels



## DISCUSSION

- Association demonstrated between the severity of hypoalbuminaemia and an increased risk of poor outcome.
- It is important to identify patients with neck of femur fractures and low serum albumin in order to direct limited Orthogeriatrician resources, to gain Input from dieticians, reduce post-operative complications and improve outcomes in patients with neck of femur fractures.
- Albumin could be combined with other biochemical markers such as Lactate or End Tidal CO<sub>2</sub>.
- We recognise limitations in the study, in that co-morbidities have not been accounted for. Pre-operative measurement of albumin levels is not routine practice and therefore prospective data may have addressed this bias. Post-operative measurement of albumin may be related to the surgery itself.

## CONCLUSION

- Our study supports a correlation between low albumin levels and survivorship in patients with neck of femur fractures. However, this may reflect existing co-morbidities rather than an isolated cause.
- Controversy surrounds correction of albumin on admission, although reduces rates of mortality but might reduce overall complications.