

Cortisol in Elderly Trauma Patients

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Background

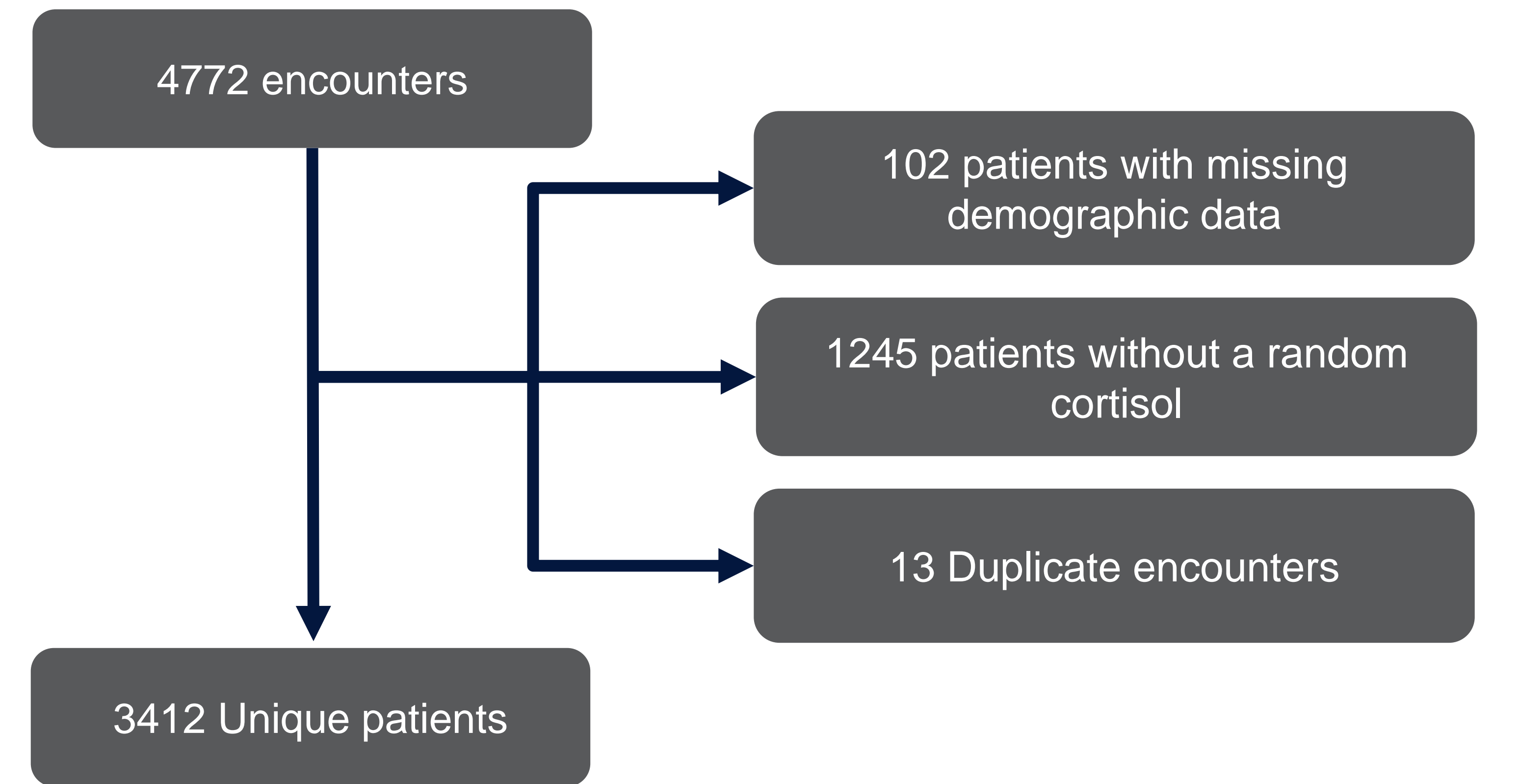
- In the United States the elderly population is increasing, and with this increase there have been increasing numbers of elderly patients involved in trauma related injuries (Victorino et al, 2003)
- Unintentional injury was the 7th leading cause of death in patients 65 and older in the united states in 2018 (Heron, 2021)
- Trauma in the elderly is becoming an important topic of discussion
- Corticosteroid levels have been shown to be associated with mortality outcomes in trauma patients
- Prospectively studied in the general trauma population (Kwok et al., 2019)
 - Severely low cortisol levels (<15 mcg/dl) when compared to patients with Higher serum cortisol levels (>15 mcg/dl) were associated with
 - Higher rates of vasopressor requirements
 - More units of blood
 - Higher rate of mortality
- The effect of serum cortisol levels has not been studied in the elderly

Hypothesis

A decreased cortisol response in the elderly population (>55 yr) will correlate with increased mortality, blood product usage, Intensive care unit, and hospital length of stay, vasopressor requirements and ventilator days.

Methods

- Retrospective analysis:** De-identified data from HCA's corporate Database,
- Study Period:** January 2016 to December of 2021



- Inclusion Criteria**
 - Trauma patients, 55 years or older
- Exclusion Criteria**
 - Non trauma patients, < 55 years of age, or patient transferred to or from other hospital

This research was supported (in whole or in part) by HCA Healthcare and/or an HCA Healthcare affiliated entity. The views expressed in this publication represent those of the author(s) and do not necessarily represent the official views of HCA Healthcare or any of its affiliated entities.

Results

Demographics					
	Mean	Median	SD	Min	Max
Age	74	74	10	55	90
LOS	13	8	14	0	180
GCS	14	15	3	3	15
HR	86	83	20	0	189
Cortisol Random	25.8	20.3	25.6	0.5	575.2
Cortisol Baseline	17.1	13.9	14.8	1.3	79.5
Cortisol AM	19.2	16.9	16.4	0.5	123.0
Albumin	3.3	3.3	0.6	1.0	6.2
AIS1	3.4	3.0	1.1	1.0	6
AIS2	2.4	2.0	0.8	1.0	6
AIS3	1.6	1.0	0.7	1.0	5
ISS	23.9	19.0	16.6	3.0	75.0
SBP	138	136	34	0	264
ICU days	8.95	5.08	10.52	0.01	125.62

LOS: Length of Stay, GCS: Glasgow Coma Score, HR: Heart rate, Cortisol AM: Morning cortisol, AIS: Abbreviated injury score, ISS: Injury severity score, SBP: Systolic blood pressure, ICU: Intensive care unit

Random Cortisol in Elderly Trauma Patients				
Odds Ratio estimates and Wald Confidence Intervals				
Effect	OR	95% CI		P-Value
Mortality	1.027	1.022	1.032	<0.0001
Ventilation	1.022	1.017	1.027	<0.0001
Inpatient Steroids	1.011	1.007	1.015	<0.0001
Vasopressors	1.023	1.018	1.028	<0.0001
Transfusions	1.004	1.001	1.008	<0.0167

Discussion

- The physiologic response to trauma is not well defined in the elderly population
- One aspect of the elderly physiologic response to trauma is the role of the hypothalamic pituitary axis
- This data shows a relationship between cortisol and an increase in mortality
 - with every 1 mcg/dl increase in cortisol the odds of mortality increases by 1.027 (p<0.0001)
- Increases in cortisol may also correlate with secondary outcomes evaluated in this study
 - With every 1 mcg/dl increase in cortisol the odds of requiring mechanical ventilation increases by 1.022 (p<0.0001)
 - We also see similar odds with increases in cortisol and the need for inpatient steroids, vasopressors, and transfusions

Conclusion

- Based on this data cortisol effects mortality and secondary outcomes in elderly trauma patients
- There is a relationship between increase in cortisol and an increase in mortality in elderly trauma patients
- Further studies are indicated to determine what levels of cortisol correspond with poor outcomes relating to mortality, mechanical ventilation, inpatient steroid requirements, vasopressor requirements, transfusion requirements

References

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