

## **Clinical outcomes for emergency department patients diagnosed with pubic rami fractures**

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### **Abstract**

#### *Aim*

This study aimed to describe the demographics and outcomes of older adults diagnosed with a pubic rami fracture in an Irish emergency department (ED).

#### *Methods*

A retrospective single centre chart review was conducted on all patients diagnosed with pubic rami fracture between 2022 and 2024.

#### *Results*

131 patients with a pubic rami fracture were identified. 89 (67.9%) were aged 65 and older. 67 (75%) were female. 101 (77.1%) patients required admission. For admitted patients, the mean hospital length of stay (days) was also longer in the older cohort compared to the younger cohort (26.2 versus 8.9,  $p < 0.05$ ).

#### *Conclusion*

Pubic rami fracture have a preponderance in older female patients and are associated with high admission rates and hospital length of stays.

## Introduction

Fractures of the pubic rami are typically classified as stable injuries which do not require operative intervention.<sup>1</sup> In older adults, pubic rami fractures are associated with one year mortality up to 16.7% and a decreased quality of life.<sup>2-3</sup> This is significant considering one year mortality post hip fracture is 20%.<sup>4</sup> There is paucity of Irish literature on outcomes of pubic rami fracture patients.

The study sought to characterize the admission rates and compare outcomes between a younger and an older cohort of adult patients with pubic rami fractures diagnosed in our ED.

## Methods

A retrospective single centre study in Tallaght University Hospital (TUH) adult ED over a three year period (2022 to 2024). Full approval was granted by the joint research ethics committee of St. James's Hospital and TUH (project id 5214).

Eligible ED patients identified from our ED information system, Symphony to be included in our study were those patients aged  $\geq 16$  years diagnosed with a pubic rami. There was a planned comparative analysis of patients aged  $< 65$  and those  $\geq 65$  years of age. The independent t- test was used for the comparison of means and chi square test was used for categorical data.

## Results

There were 175,287 presentations to Tallaght University Hospital ED between 2022 and 2024. 131 patients were identified in the study period with a pubic rami fracture with 89 (67.9%) aged 65 and older. The mean age was 67.4 years (Table 1).

Seventy-five percent (67) of patients aged  $\geq 65$  years were female. Twenty-one patients, 23.6% of all patients aged 65 and older, had a Rockwood frailty score documented and of those the median score was 4 (vulnerable).

The mean ED length of stay was 22.3 hours in the  $\geq 65$  year old group and 15.2 hours in the younger cohort,  $p < 0.05$ . The majority of patients in all age groups required admission ( $n = 101$ , 77.1%). There admission rate in the older cohort was non-statistically significantly different compared to the younger cohort (79.8% versus 71.4%,  $p = 0.06$ ). For those patients requiring admission, the mean hospital length of stay was also longer in the older cohort (26.2 days versus 8.9 days,  $p < 0.05$ ).

**Table 1:** Study population demographics and outcomes

|                                                                                  | Total         | Under 65   | 65 years and older |
|----------------------------------------------------------------------------------|---------------|------------|--------------------|
| <b>Total (n, %)</b>                                                              | 131 (100.0)   | 42 (100.0) | 89 (100.0)         |
| <b>Male (n, %)</b>                                                               | 46 (35.1)     | 25 (59.5)  | 21 (23.6)          |
| <b>Female (n, %)</b>                                                             | 85 (64.9)     | 17 (40.5)  | 68 (75.3)          |
| <b>Age (mean in years, median in years)</b>                                      | 67.40 (74.00) | 42.26 (42) | 79.26 (79)         |
| <b>Source of referral n (%)</b>                                                  |               |            |                    |
| - General practitioner                                                           | 7 (5.3)       | 0 (0.0)    | 7 (7.9)            |
| Nursing home                                                                     | 4 (3.1)       | 0 (0.0)    | 4 (4.5)            |
| Naas hospital                                                                    | 2 (1.5)       | 2 (4.8)    | 0 (0.0)            |
| Outpatient department                                                            | 1 (0.8)       | 1 (2.4)    | 0 (0.0)            |
| Self                                                                             | 117 (89.3)    | 39 (92.9)  | 78 (87.6)          |
| <b>Arrival Mode, n (%)</b>                                                       |               |            |                    |
| - Ambulance                                                                      | 104 (79.4)    | 34 (81.0)  | 70 (78.7)          |
| - Car                                                                            | 24 (18.3)     | 5 (11.9)   | 19 (21.3)          |
| - Helicopter                                                                     | 3 (2.3)       | 3 (7.1)    | 0 (0.0)            |
| <b>Mechanism, n (%)</b>                                                          |               |            |                    |
| - Blow or crush                                                                  | 2 (1.5)       | 2 (4.8)    | 0 (0.0)            |
| - Fall < 2m                                                                      | 86 (65.6)     | 9 (21.5)   | 77 (86.5)          |
| - Fall > 2m                                                                      | 16 (12.2)     | 9 (21.5)   | 7 (7.9)            |
| - Road traffic accident                                                          | 19 (14.5)     | 16 (38.1)  | 3 (3.4)            |
| - Other                                                                          | 8 (6.1)       | 6 (14.3)   | 2 (2.2)            |
| <b>ED discharge outcome, n (%)</b>                                               |               |            |                    |
| - Admitted                                                                       | 101 (77.1)    | 30 (71.4)  | 71 (79.8)          |
| <b>Discharged from Tallaght University Hospital</b>                              |               |            |                    |
| - Physiotherapy                                                                  | 6 (4.6)       | 3 (7.1)    | 3 (3.4)            |
| - Home                                                                           | 5 (3.8)       | 3 (7.1)    | 2 (2.2)            |
| - Orthopaedic Clinic                                                             | 5 (3.8)       | 3 (7.1)    | 2 (2.2)            |
| - General practitioner                                                           | 3 (2.3)       | 1 (2.4)    | 2 (2.2)            |
| - Transfer other Hospital                                                        | 4 (3.1)       | 0 (0.0)    | 4 (4.5)            |
| - Other                                                                          | 7 (5.3)       | 2 (4.8)    | 5 (5.6)            |
| <b>Mean ED length of stay (hours)</b>                                            | 20.0          | 15.2       | 22.3               |
| <b>If admitted patients, final hospital discharge outcome (n, % of admitted)</b> |               |            |                    |
| - Home                                                                           | 56 (55.4)     | 28 (93.3)  | 28 (39.4)          |
| - Mortuary                                                                       | 3 (3.0)       | 1 (3.3)    | 2 (2.8)            |
| - Other hospital                                                                 | 8 (7.9)       | 1 (3.3)    | 7 (9.9)            |
| - Nursing home and rehabilitation facilities                                     | 31 (30.7)     | 0 (0.0)    | 31 (43.7)          |
| - Other                                                                          | 3 (3.0)       | 0 (0.0)    | 3 (4.2)            |
| <b>If admitted, mean hospital length of stay (days)</b>                          | 21.1          | 8.9        | 26.2               |

Thirty-one of the admitted patients, all aged 65 years and older, were ultimately discharged from the hospital to a nursing home or rehabilitation facility. Three patients died as in-patients in the study cohort.

## **Discussion**

Consistent with international literature, this study found pubic rami fractures in our ED are associated with high admission rates, and high length of stays.<sup>1-3</sup>

The preponderance of pubic rami fractures in older females, the mechanism of injury being a fall less than 2 meters in this study is consistent with international and Irish data.<sup>3,4-5</sup> Early comprehensive geriatric assessment is important to identify geriatric syndromes. In our ED, the Gerontological Emergency Department Intervention (GEDI) team endeavour to identify and initiate management of the physical, functional and social care needs of older patients.<sup>6</sup>

This study focused solely on pubic rami fracture but it is known that greater than 54% of patients can have concomitant fractures of the posterior ring.<sup>8</sup> Plain radiographic imaging is the first line imaging modality in our institution to diagnose pubic rami fractures but it is known to have 10.5% sensitivity of detecting fractures of the posterior pelvic ring.<sup>8</sup> Missing fractures of the posterior pelvic ring may have therapeutic consequences, and CT should be considered for patients with pelvic pain and inconclusive or negative pelvic radiograph.<sup>8</sup>

Crawley et al in a retrospective study of geriatric trauma patients found 64.7% were already at risk for falling in the 12 months prior to admission.<sup>9</sup>

The study has the inherent limitations of being a retrospective single centre study. The study focussed on patients with an ED discharge diagnosis of pubic rami fracture. Potentially some included patients may have had other system injury or concomitant medical illness which prolonged the hospital stay or the cause of death. Future studies can assess impact of falls education and preventive measures addressing environmental hazards, personal risk factors, and physical limitations are essential.<sup>10</sup>

Pubic rami fractures have a preponderance in older female patients and are associated with high admission rates and length of stays. Education delivery and implementation of proven techniques to prevent falls are important to consider at every interaction with an older patient.

## **Declarations of Conflicts of Interest:**

None declared.

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