

# Collaboration of Emergency department and Orthopaedic department is associated with patient's mortality in orthopaedic trauma care.

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## INTRODUCTION:

Orthopaedic trauma is often associated with life-threatening multiple trauma, and even if a single fracture is sustained, there are cases of poor general condition with serious comorbidities, such as cardiovascular comorbidities. In Japan, emergency physicians are in charge of initial treatment in the emergency room and general management in the intensive care unit. Collaboration of the Emergency department, which is skilled in systemic management including respiratory and circulatory management, and Orthopaedic department, which specializes in the treatment of extremity, spine, and pelvic trauma, is expected to improve not only life expectancy but also functional prognosis. The purpose of this study is to investigate whether collaboration of Emergency department and Orthopaedic department in the treatment of orthopaedic trauma has an impact on the life expectancy of patients.

## METHODS:

One hundred and sixty trauma patients treated jointly by the Emergency department and the Orthopaedic department at the hospital over a 3-year period from April 2020 to March 2023 were included in the study. The emergency group consists of patients who received initial treatment and definitive treatment, including surgery, in the Emergency department from admission to discharge, the transfer group consisted of patients who were initially admitted to the Emergency department for systemic management and transferred to Orthopedics after their general condition improved., and the concurrent group consisted of the patients who were admitted to the Orthopedic department but required systemic management such as respiratory and circulatory management by an emergency physician due to deterioration of their general condition. Statistical analysis was performed on age, sex, changes in group proportions, the proportion of multiple trauma, and mortality at the time of discharge from the hospital. In this study, multiple trauma is defined as the presence of injury to more than one body area or system. Statistical tests were performed using Fisher's exact test and one-way analysis of variance.  $p < 0.05$  was considered significant. This study was approved by the Ethics Committee of our institution.

## RESULTS

The number of patients in the emergency, transfer, and concurrent groups were 41 (21 males, 20 females), 78 (50 males, 28 females), and 41 (30 males, 11 females), respectively. The mean age was 64.3, 64.1, and 69.8 years, respectively, with no significant difference between the groups. The ratio of the groups was approximately 70% in the emergency group and the transfer group, with a significant increase in the emergency group over time (Figure 1.  $p < 0.001$ ). The proportion of multiple trauma was significantly higher in the emergency and transfer groups (Figure 2). The mortality of patients in the emergency, transfer, and concurrent groups were 9.8% (4/41), 0% (0/78) and 12.2% (5/41), respectively. Mortality rates were significantly lower in the emergency and transfer groups compared to the concurrent group (Figure 3). The 4 deaths in the emergency group were 1 patient with hemorrhagic shock, 1 patient with ARDS, 1 patient with acute renal failure, and 1 patient with postoperative pulmonary thromboembolism, and many of the patients were in poor general condition from the time they arrived at the hospital. The 5 deaths in the concurrent group included 3 patients with postoperative aspiration pneumonia, 1 fatal arrhythmia due to hypokinesia, and 1 death of unknown cause, which were due to deterioration of postoperative general condition.

## DISCUSSION:

This study revealed that life expectancy improves when the Emergency department is in charge of the patient from admission to discharge or when the patient is initially treated in the Emergency department as an attending physician and then transferred to an Orthopaedic department after his/her general condition improves. Conversely, intervention by the Emergency department after deterioration of the patient's general condition in the orthopaedic department was associated with increased mortality. The emergency and transfer groups had significantly better life outcomes than the concurrent group, despite a higher proportion of multiple trauma cases. With the aging of society, there are increasing opportunities to treat elderly patients with comorbidities in orthopaedic trauma care, and this number is expected to increase in the future. Collaboration of the Emergency department and Orthopaedic department is considered very important in the treatment of orthopaedic trauma.

## SIGNIFICANCE/CLINICAL RELEVANCE:

From lifesaving and intensive care to functional reconstruction and reintegration into society, cooperation of the Emergency department, which excels in systemic management, and the Orthopaedic department, which excels in local trauma treatment, will become even more important.

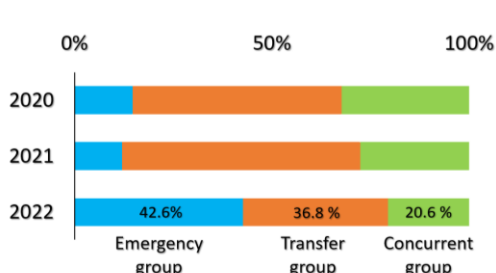


Fig.1 Yearly changes in groups.

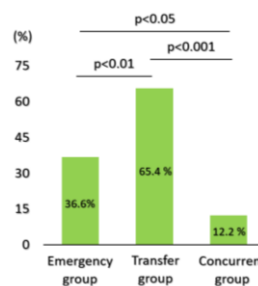


Fig.2 Proportion of multiple trauma among groups.

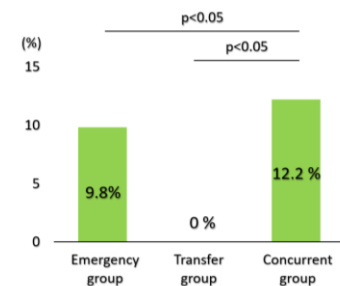


Fig.3 Mortality among groups.