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# Comparing the Efficacy of Surgical and Non-Operative Treatment for Abdominal Injuries in Children: A Comparative Study

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## Abstract

Despite a decrease in traffic fatalities over the past 30 years, unintentional injury remains a leading cause of death for children in Japan, with road accidents being the most common cause. Abdominal trauma is a frequent type of injury, and non-operative management has become the standard of care for pediatric solid organ injuries. However, surgical treatment may still be necessary in certain cases. Previous studies have developed management algorithms based on hemodynamic stability and hemoglobin monitoring as indicators of ongoing blood loss. This study aims to evaluate the effectiveness of non-operative management for pediatric abdominal trauma, in hopes of reducing child road traffic fatalities in Japan

**Keywords:** Unintentional injury • Abdominal trauma • Hemodynamics

## Introduction

We examined all pediatric cases of abdominal trauma, including cardiopulmonary arrest (CPA), to expand our understanding of how surgical decision-making influences on arrival) cases in our hospital, with an emphasis on the development of management strategies. Japan has 289 adult critical care medical centers and 14 pediatric critical care medical centers are certified. Our hospital is one of five that are registered as both adult and pediatric critical care medical centers. Our hospital is one of a kind because it is licensed as both an adult and pediatric critical care medical center and has wards for both adults and children. Additionally, it is regarded as the only children's hospital in Japan's Okinawa prefecture. Around the mainland of Okinawa are numerous islands [1].

## Literature Review

There are 1.43 million people living in Okinawa, with 0.13 million living on islands. Ambulance and helicopter transport the majority of severe pediatric cases from far-flung islands and the southern part of the mainland to our hospital. For the purpose of the study, individuals with abdominal injury-related trauma were chosen. Based on X-ray, computed tomography (CT), and laboratory data, the following trauma scoring systems were used to grade the injury: Injury Severity Score (ISS), Revised Trauma Score (RTS), and the Probability of Survival (Ps), which the Trauma and Injury Severity Score is able to predict.

Operational management and non-operative management were contrasted. Interventional radiology (IVR) procedures include laparotomy and transcatheter arterial embolization (TAE) as forms of surgical management. Patients who require hemostasis at our institution will undergo IVR procedures rather than laparotomies due to the absence of a laparotomy setting in the emergency department. Additionally, from the perspective of damage control resuscitation, TAE is one of the best methods for controlling patients whose hemodynamics are unstable. In this study, patients who receive operative treatment for associated non-abdominal injuries were included in non-operative management; the abdominal injury is the primary focus of surgical treatment. Morbidity or mortality within 30 days of arrival was used to evaluate outcome. We looked at which organ was damaged in each patient and what treatments were used. In addition, our cases were examined to determine whether they involved a single organ or multiple organs, and they were examined by either an adult or a pediatric physician [2,3].

## Discussion

Five of the 11 cases had multiple organ injuries. In image studies, unstable vital signs, free air, extravasation, and an exacerbation of symptoms indicated operative management. Adult general surgeons or emergency room physicians made the decision to intervene in six of the 11 operative cases. Four cases required intra-abdominal gauze packing, five required TAE by IVR procedures, three required intestinal resection, one required diagnostic laparotomy, and three required resuscitative thoracotomies as surgical treatments. The operative group was responsible for four of every five deaths. The four patients all arrived at our hospital with extremely low Ps and CPA or shock. In 53 cases, multiple organ injuries were the cause of all five deaths. When there are multiple traumas, it can be difficult to decide whether to operate on each individual case. However, our study's findings indicate that our intervention decisions were acceptable due to the fact that the majority of the non-operative group survived and the Ps of mortality cases was so low in the first place [4].

The algorithm of the American Pediatric Surgery Association's (APSA) Arizona-Texas-Oklahoma-Memphis-Arkansas Consortium (ATOMAC) guideline was used to evaluate the decision-making process for operative or non-operative management. According to the ATOMAC guideline, two cases were treated surgically when they should have been treated non-operatively. These two cases were seen by adult physicians. These choices went against the ATOMAC guideline's idea. A 14-year-old girl with a blunt grade IIIa splenic injury was the first case. Her vital signs were stable, and contrast CT revealed fluid collection at the pelvis. However, there was no indication of active bleeding. The adult ER doctor, on the other hand, decided to go to TAE. The second case involved a 6-year-old boy who sustained a grade IIIb liver injury in a car accident. Contrast CT revealed extravasation, and the adult surgeon and ER doctor decided to perform TAE despite stable vital signs. As if they were adult cases, both cases were treated [5,6].

Several studies have shown that most injuries to the liver and spleen can be treated without surgery, while some injuries to the pancreas and intestinal tract require surgery. Six of the 26 liver injuries, or 23.1%, required operative

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treatment, as shown by our findings. Three of these six operative cases arrived with multiple injuries in shock or CPA. One of the remaining three patients did not have unstable vital signs, but all three had extravasation on CT and underwent TAE. As previously stated, an adult physician decided to embolize this stable TAE case. All twenty cases of non-operative liver injury had hemodynamic stability. The only splenic injury with operative management was a grade IV injury that required TAE; As previously mentioned, an adult physician made the intervention decision. According to the ATOMAC guideline, the majority of our strategy was within the standard non-operative care for pediatric trauma, with the exception of the high operative rate for liver injuries [7-10].

## Conclusion

Pediatric trauma cases are not always seen by pediatric specialists because our institution has both adult and pediatric wards. It is already known that pediatric trauma centers have a higher rate of non-operative treatment than adult trauma centers do, and that the prognosis for non-operative treatment is better than that of operative treatment. We must acknowledge that some cases could have been managed non-operatively if patients had been seen by pediatric surgeons rather than adult general surgeons or emergency room physicians. Despite the fact that the majority of pediatric trauma cases were successfully treated without surgery, the decision to perform surgery must be made immediately. We had a case that needed to be handled quickly, so the emergency room doctors decided to do a laparotomy without waiting for the pediatric surgeons to talk about it.

## Acknowledgement

Not applicable.

## Conflict of Interest

There is no conflict of interest by author.

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