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RESEARCH ARTICLE
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ASSESSING THE ROLES OF RADIOLOGISTS AND SURGEONS IN MANAGING HEPATIC TRAUMA AT A TERTIARY CARE HOSPITAL

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ABSTRACT

Introduction: Hepatic trauma presents a serious challenge for emergency medicine staff because it carries a high risk of major mortality and morbidity. The extent of liver injury determines appropriate treatment because professionals use diagnostic images along with supportive care while reserving surgery for severe cases. A cooperative system between radiologists and surgeons proves essential to advance therapeutic success for patients.

Objectives: An analysis has been conducted at a tertiary care hospital to evaluate radiology and surgery professionals who manage hepatic injury patients while studying their impact on therapeutic approaches and results.

Materials and Methods: Research team members gathered data at Pir Abdul Qadir Shah Jilani Institute of Medical Sciences, Gambat, Sindh using a sample of 75 patients within the retrospective cohort study. The research data collected from September 2018 to August 2024 underwent analysis for diagnostic approaches alongside treatment methods and patient result evaluations.

Results: Research demonstrated that embolization as a non-surgical treatment approach successfully treated 55% of patients, while surgical intervention became necessary for the remaining 45% of patients.

Conclusion: Hepatic trauma patients achieve better management and clinical outcomes through joint efforts between radiologists and surgeons.

Keywords: Hepatic trauma, radiologists, surgeons, embolization, surgical intervention, tertiary care hospital, patient outcomes.

INTRODUCTION

Hepatic trauma presents substantial clinical difficulties due to complex manifestations and various treatment results, which occur particularly within blunt and penetrating trauma cases. The liver experiences frequent injury in abdominal trauma cases, resulting in damage that ranges from minor tissue bruises to dangerous internal bleeding (1). Diagnosis techniques for liver trauma have advanced over time because CT scans and ultrasounds are crucial tools for evaluating the severity of damage to guide treatment plans (2). The treatment of liver trauma in the present era relies on multi-specialty

teamwork between radiologists and surgeons who work together to decide on proper interventions according to injury severity.

Traumatic liver injuries earn their severity scores through the American Association for the Surgery of Trauma (AAST) grading system that runs from Grade I (minimal injury) to Grade VI (severe injury accompanied by large blood loss and liver avulsion) (3). Liver trauma management now focuses on non-surgical interventions such as conservative approaches for lower-grade conditions (4). The core goal in liver trauma management involves controlling blood loss and preventing infections, along with sustaining liver metabolic operations without requiring major surgical procedures (5). Interventional radiologists play a crucial role under the guidance of radiologists in liver trauma management through embolization as a bleeding control technique that has cut down emergency surgical requirements (6).

Surgeons must treat advanced forms of trauma because they cannot be treated conservatively or via interventional radiology approaches. Surgical treatments include different techniques, starting with direct repair and ending with hepatectomy, depending on the amount of liver damage (7). Clinical situations require integrated therapy that connects surgeries with interventional radiology procedures to achieve better patient results (8). The modern combined treatment methodology improves treatment results while decreasing the unwanted consequences of traditional surgical interventions (9). The quality of diagnosis during the early phase of liver injury plays a crucial role because it determines treatment decisions and patient recovery outcomes. Blunt liver injuries are most appropriately diagnosed through CT scanner imaging due to their superior ability to show detailed views of liver damage and identify vascular structures (4). The management challenge increases when other organs and the liver sustain injuries during diagnosis (5). CT stands as the most preferred imaging method for complete examination although ultrasound remains readily accessible yet fails to reveal minor hepatic injuries (10).

Tertiary care facilities at the Pir Abdul Qadir Shah Jilani Institute of Medical Sciences in Gambat, Khairpur Mir's, Sindh, handle many hepatic trauma cases due to which they depend on multidimensional teams to address these complex injuries (6). The successful delivery of the highest-quality medical care depends on the combined clinical skills of radiologists and surgeons. The technique brings fast improvements and benefits liver function and survival results in the long term (11).

The collaborative management approach demonstrates positive findings by lowering death rates and disease complications from traumatic liver wounds. Non-operative intervention with selective embolization shows particular efficacy in treating stable patients who have either Grade I or II liver injuries according to research (12). The medical world witnesses an ongoing transition toward minimal intervention through careful bleeding management because surgery remains restricted to events when other non-surgical methods fail (13). The field of interventional radiology keeps advancing new techniques which offer minimally invasive medical procedures for urgent patient situations (15). The recent developments in hepatic trauma treatment require exploring the distinct functions of radiologists and surgeons in tertiary care hospitals for hepatic trauma management. The evaluation of specialist roles in liver trauma management alongside their joint impact on patient results allows us to create better practices for treating liver trauma (14). The research evaluates doctor-patient care for hepatic trauma management at a tertiary hospital by examining how radiologist and surgeons work separately and together throughout the treatment path.

Research data indicates that earlier diagnosis coupled with fast medical intervention and suitable treatment plans leads to improved outcomes for patients who suffer liver trauma (2). Continuous advancement of liver trauma care depends on ongoing research coupled with continuous professional development for both radiology and surgery. The research investigates the actual clinical practice of these evolving management approaches to enhance understanding regarding maximizing liver trauma treatment outcomes in current medical settings.

Objective: This research evaluates the activities of radiologists and surgeons who manage hepatic trauma cases within a tertiary care facility while examining their impact on patient results along with therapeutic approaches.

MATERIALS AND METHODS

Study Design: Cross-sectional study

Study setting: The study was carried out at the tertiary care facility that acts as the area's main healthcare provider, Pir Abdul Qadir Shah Jilani Institute of Medical Sciences, Gambat, Khairpur Mir's, Sindh.

Duration of study: The study was conducted over a period from September 2018 to August 2024.

Inclusion Criteria:

The research included all hospitalized patients who received hepatic trauma diagnosis which involved blunt or penetrating injuries. To be included in the study, patients needed to have diagnostic imaging tests documenting hepatic trauma as well as surgical or nonsurgical treatments recorded. Any patient old or young of either gender with liver injuries at the study location qualified for research participation.

Exclusion Criteria

The study excluded patients who lacked complete medical records and those who disappeared during follow-up periods after hospital discharge. The study avoided consideration of patients who presented with liver conditions like cirrhosis or chronic hepatitis since such conditions might affect management outcomes. The research excluded patients who faced multiple organ injuries yet had no liver trauma as their primary condition to concentrate on liver trauma treatment.

Methods

A total of 75 patients with hepatic trauma received treatment at Pir Abdul Qadir Shah Jilani Institute of Medical Sciences, Gambat, Khairpur Mir's, Sindh, during the time period from September 2018 to August 2024. Hospital medical records provided data from 75 hepatic trauma patients about their clinical symptoms combined with diagnostic findings therapeutic practices and results. The evaluation of radiologists and surgeons focused on their intervention methods, including embolization as a non-surgical treatment and either liver restoration or hepatotomy as a surgical procedure. Surgical decisions for liver trauma relied on the severity grade of injuries established by the (AAST). However, the diagnostic methods involved (CT) scans, ultrasounds and angiography. The analysis evaluated how treatment solutions affected patient recovery, along with the duration of recovery and treatment-associated complications and mortality rates. Statistical analysis evaluated the effectiveness of management techniques combined with radiologist and surgeon partnership roles affecting patient results.

RESULTS

The study comprised 75 patients with hepatic trauma, including those with penetrating and blunt injuries. The mean age of the patients was 32 years, and the majority were male (62%). From mild contusions to potentially fatal hemorrhages, the study population's injuries varied in severity. While (52%) of patients had penetrating injuries, a sizable portion (48%) had blunt trauma. Table 1 provides detail on the distribution of injuries.

Table 1: Distribution of Patients Based on Trauma Type

Trauma Type	Number of Patients	Percentage (%)
Blunt Trauma	36	48%
Penetrating Trauma	39	52%

Computed tomography (CT) scans, ultrasonography, and angiography were among the diagnostic techniques utilized in the treatment of these individuals. With (72%) of instances, (CT) scans were

the most often utilized diagnostic procedure, with ultrasonography coming in second with (20%) of cases. The most severe cases, especially those with significant bleeding (8%), were treated with angiography. Table 2 provides a summary of the diagnostic procedures results.

Table 2: Diagnostic Methods Utilized

Diagnostic Method	Number of Patients	Percentage (%)
CT Scan	54	72%
Ultrasound	15	20%
Angiography	6	8%

In terms of treatment plans, (55%) of cases involved non-surgical care. These individuals had mild liver damage (Grades I to III) and were hemodynamically stable. In addition to conservative measures including bed rest and observation, non-surgical therapies included embolization, which was utilized in (35%) of patients. In (45%) of cases, surgical intervention was necessary, especially for patients with severe injuries (Grades IV to VI). Hepatectomy, liver repair, and occasionally a mix of surgery and interventional radiology were among the surgical techniques. Table 3 displays these findings.

Table 3: Treatment Strategies and Interventions

Treatment Method	Number of Patients	Percentage (%)
Non-Surgical (Embolization, Observation)	41	55%
Surgical (Repair, Hepatectomy)	34	45%

The investigated treatment outcomes included restoration times, complication rates, and death statistics. Non-surgical patient recovery periods averaged 10 days but surgical patients took twice as long at 16 days. In (20%) of cases there were complications which primarily consisted of infections with (12%) frequency and rebleeding with (8%) frequency. The mortality rate reached (6%) and Grade V and VI liver injuries exhibited the highest rates of death among patients. For Grade V and VI liver injuries the success rates between non-surgical and surgical management were (85%) and (90%). The study findings show that hepatic trauma management requires joint expertise between radiologists and surgeons at all times. The treatment of lower-grade hepatic injuries became effective through non-surgical embolization while severe levels of hepatic trauma needed surgical interventions for management. The cooperation between radiologists and surgeons improved recovery times and decreased complications, which greatly improved patient outcomes.

DISCUSSION

The management of hepatic trauma involves complex procedures across tertiary care facilities because patients arrive with diverse injury severities. The investigation determined the intervention activities of radiologists and surgeons for hepatic trauma management through a six-year analysis of 75 patients from Pir Abdul Qadir Shah Jilani Institute of Medical Sciences in Gambat, Sindh. The study underlines the necessity of united medical specialist teams of radiologists and surgeons to improve hepatic trauma treatment results. This study established that penetrating trauma cases (52%) surpassed those of blunt trauma (48%) in agreement with similar trauma data elsewhere (6). According to the research, areas with high levels of trauma and violence also have higher rates of violent injuries including gunshot and slashing wounds. The research showed interesting results because most patients with liver injuries received classifications within the Grade I to III categories (3). Conservative methods can usually treat these lower-grade injuries. Research now indicates that stable patients with mild injuries should receive non-operative treatment which matches the findings from this sample data. AIOSA provides effective bleeding control methods and maintains liver health for patients mainly affected by Grade I to III injuries through non-surgical treatments (2).

Images obtained through diagnostic procedures were vital in liver trauma treatment protocols during this study. Computerized tomography (CT) scanning maintains its status as the primary diagnostic tool for examining abdominal trauma injuries since it was employed in (72%) of cases (4). (CT) scans deliver outstanding detection capabilities for liver injuries provide the most benefit when identifying complete liver parenchymal and vascular damage extents. Ultrasound proved effective for diagnosis but its utilization in only (20%) of cases indicates that it cannot identify minimal or complex injuries that cannot be seen in the initial assessment (10). The application of angiography in (8%) of cases focused primarily on massive haemorrhage patients and patients requiring embolic treatments (5). The importance of quick and precise medical imaging techniques becomes evident because they support clinical judgement and selection of appropriate treatment approaches.

Non-surgical treatments have emerged as a major technique shift in how healthcare professionals manage hepatic trauma. Embolization proved to be the main intervention for bleeding control in the non-surgical treatment approach that involved(55%) of patients in our study. Medical treatments have shown significant success in treating Grade I to III hepatic injuries according to recent research reports (14). The medical procedure known as embolization delivers highly successful bleeding control when surgery presents significant hazards to patients. Embolization treatment resulted in a 35% patient enrollment that effectively stabilized these patients while minimizing further harm to the body. The safety data from this patient sample (12%) matches findings from previous studies about embolization as an effective liver trauma treatment method (6).

However, surgery as an initial therapy remains a significant part of the treatment for liver injury because of the advancement of surgical management. In this evaluation, (45%) of patients needed surgery, for mostly Grade IV to VI injuries, which entails considerable parenchyma damage, active haemorrhage or bile duct injury. For these severe injuries, surgery such liver repair and hepatic lobectomy is still the only option, particularly if treatments are unable to stop blood loss if the patient's health reduces (7). The survival of the patients who underwent one or more operations was (90%) which is in accordance with the other data and proves that surgical intervention is still rather efficient method when performed timely for the treatment of severe liver injury (13).

Another aspect to consider for this study is how interventional radiology can be considered as a link between non-operative and operative treatment. Notably, performing embolization alongside surgical management, known as hybrid management, is becoming more popular for treating complex liver injuries (15). At present, we found that (8 %) of patients in the initial group of embolization patients underwent surgery because of failure of the initial conservative approach. This shows the essence of close follow-up and the need for surgical management once conservative measures fail to offer adequate control. Besides, it also makes the treatment more effective and less invasive compared to the traditional surgical procedures that may cause additional complications and longer rehabilitation time.

Regarding the complications in those with hepatic injury management in this study, the percentage was considerably low at (20%). The most frequent were infections, which are also associated with the general risk factors for traumas and their surgical management (8). Of all the complications, rebleeding appeared to be the most frequent in our study as it occurred in(8%) of all cases, and it was worst among patients with serious liver injuries. These results propose that for patients with high-grade injury to the liver, it is necessary to pay much attention and close follow-up to detect complications for early treatment. The mortality of such patients in this study was (6%) with higher mortalities recorded among patients with Grade V and VI liver injuries. These findings are in conformity with other researchers who stated that severe liver injury especially when the patient has other ISS than major abdominal bleeding increases mortality rate (9). It is for such reason that the over-survival rate in this study supports the affirmative effects of improved diagnostic and treatment methodologies not forgetting the holistic approach to treatment.

Lastly, it is acknowledged that the management of hepatic trauma entails a coordinated effort from radiologists, surgeons, and other health care practitioners. This article focuses on the significance of diagnostic imaging and interventional radiology in the early evaluation and treatment of liver injuries. Recent advancements in non-surgical management, especially embolization, increase the survival of

patients with lower-grade injuries, while surgeries are a must for high-grade injuries. This has been made possible by practising the various approaches with special adoption of blended or hybrid models. Further studies of these management strategies should take place and, additionally, the outcomes of patients treated for hepatic trauma should be investigated further.

CONCLUSION

Overall, this paper demonstrates the importance of the radiologist and surgeon in the care of hepatic injury at a teaching hospital. This work supports the need for collaboration between specialists, radiologists, considering that they are the main diagnosticians in the utilization of imaging, including CT, in liver injury assessment. Non-operative intervention through embolization has been shown to be efficient in the management of lower-grade lesions, and results are often favourable. However, there is validity in using surgical interventions in severe injuries, especially when there is massive bleeding or destruction of liver tissue. The combined treatment involving interventional radiology and operation has been established as one of the most effective ways to treat various diseases with fewer possible complications affecting the patients. Lastly, it can be stated that better team cooperation between the radiology and surgical services significantly improves the outcome of hepatic trauma cases in terms of recovery rates, minimal complication, and survival.

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