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The Complication of Tibial Fractures with Ilizarov External Fixation: A longitudinal study

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ABSTRACT

Aim: The purpose of this study was to assess if the Ilizarov ring fixator caused any problems in open tibial fractures.

Study design: A longitudinal study **Place and Duration:** This study was conducted at Muhammad Medical College and Hospital Mirpurkhas, Pakistan from January 2020 to January 2021.

Methodology: For this study, 55 adults were included. Clinical evaluations were performed on the patients based on their medical histories and physical examinations. Acute open grade III tibia fractures with >5cms of bone loss and infected non-union with or without prior history of internal fixation were included in this study. Plain anteroposterior and true lateral radiographs were utilized to evaluate the affected limb to measure the complications.

Results: Out of the 55 cases, 48 were male, and seven were female. In 47 of the 55 instances, the right tibia was implicated. In 92% of cases, there was a history of a car collision on the side of the road, and 7% of cases had a history of a fall from height. The limp was observable in 38 cases (45%), ankle stiffness in 12 cases (28.34%), pin site infection in 21 cases (38%), limb oedema in 14 cases (28.09%), loosening of pins in 1 case (3.3%), knee stiffness in 6 cases (15%), deformity (>7 degrees) in 4 cases (3.4%), and refracture in three cases (4.4%).

Conclusion: The most common consequences were limb and pin tract infection. The majority of problems can be avoided with proper post-operative care. Complications can be adequately handled if detected early.

Keywords: Fracture, Ilizarov technique, infection, tibia.

Introduction: -

Tibial plateau fractures are difficult to cure surgically. Articular depression, condylar comminution, diaphyseal involvement, soft tissue and ligament injuries, related neurovascular injury, and

compartment syndrome are all issues to be aware of. (1)

Associated disorders such as chronic infection, soft tissue and bone loss, the discrepancy of limb length, and deformity might exacerbate non-union of a fracture. (2) Orthopaedics surgeons have long been frustrated by infected tibial non-union. (3) To be successful, articular cartilage must be restored, anatomy must be preserved, the mechanical axis must be aligned, joint stability must be restored, and functional mobility must be maintained. (4) The theory of tension stress describes how bone and soft tissue regeneration occurs under tensile forces in Ilizarov's treatment procedure. When treating a non-union or a bone defect, the Ilizarov fixator offers the advantage of reducing the risk of angular or rotational abnormalities and allowing for easy correction in the event of a deformity. (5) Although most investigations on tibial bone abnormalities treated with Ilizarov procedures have yielded excellent results, there have been a few reports that have yielded less-than-ideal results. (6, 7) This device offers excellent stability and allows for early weight-bearing. The downsides are that it is inconvenient, difficult to dress wounds, necessitates knowledge, and is a costly instrument. (8) The limited anatomic pathways in which fine wires in the diaphysis can be positioned to minimise neurovascular damage is their primary limitation. (9) These wires irritate tendons and transfix muscle, causing pain, loss of movement, and perhaps increasing the risk of pin site infection and joint contracture in the area. Wires are more difficult to remove and inconvenient. Another disadvantage is the frame's intricacy and design. These concerns, as well as the time it takes to fix the problem and the risk of consequences, are reduced when the number of wires is reduced. (10) This study aimed to assess the role of Ilizarov fixation in the treatment of infected tibial nonunion and the complications and functional outcomes.

Methodology

The purpose of this longitudinal study was to assess if the Ilizarov ring fixator caused any problems in open tibial fractures. The study investigated 55 adult patients. Permission was taken from the ethical review committee of the institute. Acute open grade III tibia fractures with >5cms of bone loss and infected non-union with or without prior history of internal fixation were included in this study

Study subjects with serious medical comorbidities and metabolic disorders, as well as those who smoked heavily and had irreparable Tibial nerve injury, were disqualified from the study. Until the frame was removed, follow-up was done monthly. The individuals were clinically evaluated based on their medical histories and physical examinations. Plain anteroposterior and true lateral radiographs were used to evaluate the afflicted limb radiologically. Pin-track infection, wire loosening, axial deviation, mal-union, wire breakage, knee and ankle stiffness, and limb oedema, were all reported as complications. The findings were analysed using percentages. SPSS version 23 was used for data analysis.

Results:

All n=55 patients' medical records and serial radiographs were examined. The average age in our study was 38.4 years. Out of the 55 cases, 48 (87.27%) were male, and 7 (12.73%) were female. Out of 55 instances, 47 (85.4 %) involved the right tibia. There was a history of roadside collision in 51 (92%) cases and a history of fall from height in 4 (7%) cases. In 10 cases (18.14%), the proximal tibial shaft was impacted, while the intermediate and distal tibial shafts were afflicted in 30 (54.53%) and 15 (27.27%) cases, respectively. (As shown in Table 1). Infected non-union with bone loss accounted for 38 (69.09%) of the 55 cases, while open fracture IIB/IIIC with bone loss accounted for 17 (30.09%). The average consolidation period was 7.9 months, with a 7.2 cm average bone lengthening. Limp was existing in n=38 cases (45%), pin site infection in n=21 (38 %), ankle stiffness n=12 (28.34 %), limb oedema n=14 (28.09 %), pain n=13 (18.37 %), knee stiffness n=6 (15 %), loosening of pins n=1 (3.3 %), deformity (>7

degree) n=4 (3.4 %), and refracture n=3 (4.4 %). (As shown in Figure 1) There was no non-union, neurovascular damage, malunion, wire breakage, limb length disparity were observed due to the procedure.

Table-1: Demographic Characteristics of the Participants

| Characteristics | No. of patients n=55 | % |
|----------------------------|-------------------------|-------|
| Average age | 38.4±11.4 years | |
| Gender | | |
| Male | 48 | 87.27 |
| Female | 7 | 12.73 |
| Mode of injury | | |
| Roadside collision | 51 | 92 |
| Fall from height | 4 | 7 |
| Side effected | | |
| Proximal tibial shaft | 10 | 18.14 |
| Intermediate tibial shafts | 30 | 54.53 |
| Distal tibial shafts | 15 | 27.27 |

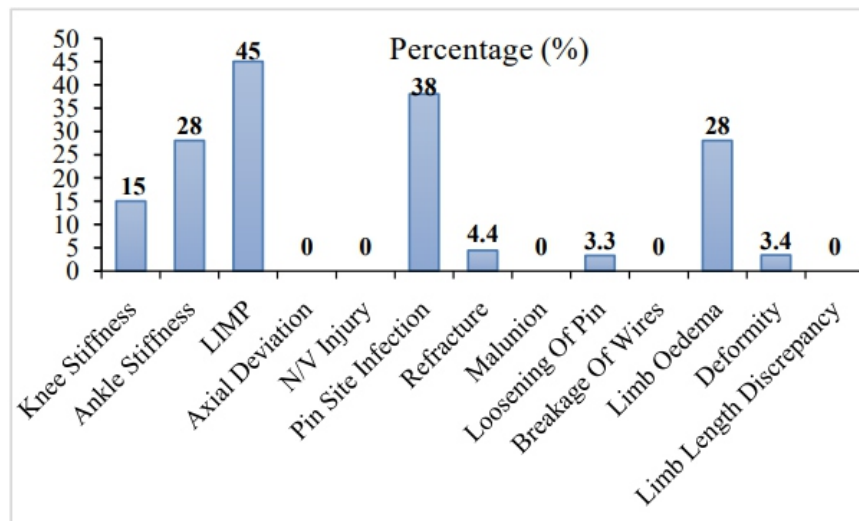


Figure 1: Percentage of Complications

Discussion:-

Infected non-union of the tibia can be difficult to treat with segmental bone loss, many draining sinuses, insufficient soft tissue coverage, osteopenia, surrounding joint stiffness, limb deformity, or a multidrug-resistant polymicrobial infection. (11) Amputation can result in permanent functional losses and protracted recuperation times. (12) The goal of this longitudinal study was to assess complications associated with the Ilizarov ring fixator in open tibial fractures.

In this study, 55 individuals were included, and the average age was 38.4±11.4 years. Out of the 55 cases, 48 (87.27%) were male, and 7 (12.73%) were female. A similar study was conducted in Peshawar Hospital, Pakistan that Ilizarov was used to treat 90 individuals for a variety of reasons. Males made up 65 % of the population and were dominant (72.2 %), while females made up only 25 % (27.8%). (13)

The current study had a 100% union rate. Multiples studies were conducted by the different scientists on the Ilizarov fixator. (14-17) One of the most prevalent Ilizarov consequences is pin site infection. In the

current study, infection at the pin site was found in 38% of the cases.

While different researches found infection at the pin site approx. 36 %, 60.6 %, and 45 % of cases, in investigations on the Ilizarov fixator. (15, 17-19)

According to Messner et al., this fixator technique is a harmless, operational, and reliable procedure for treating tibial fractures with good but short-term results. (20) In this study, the entire complication rate of deformity existed at 3.4% whereas, Limp was existing in n=38 cases (45%), pin site infection in n=21 (38 %), ankle stiffness n=12 (28.34 %), limb oedema n=14 (28.09 %). This was similar to the findings of Ali et al., who found pin tract infections in n=29 (32.2%) of the patients. Knee stiffness was another consequence that occurred in 13.3 % of the 90 patients in the study.(13) Raza et al. found a similar finding, reporting that out of 22 cases, 18 patients had pin-tract infection.(21) Other research examined the rate of complications with external fixation devices and suggested potential treatments. On the other hand, these publications are only concerned with short-term problems or deformity treatment. (22-24)

The current study shows that the Ilizarov procedure can be used to treat infected tibial nonunion even in impoverished nations like Pakistan, where resources and knowledge are scarce.

Despite the constraints of a resource-constrained environment, the success rate and issues are comparable to those documented in international literature.

However, the lack of a control group is a flaw in this study. As a result, large-scale prospective and multi-center studies, particularly from poor countries, are still required to support the current study's conclusions.

Conclusion: -The most common consequences were limb and pin tract infection. The majority of problems can be avoided with proper post-operative care. Complications can be adequately handled if detected early.

Funding source

None

Conflict of interest

None

Permission

Permission was taken from the ethical review committee of the institute

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Impact of Operating Time on the Surgical Outcome of Epidural Hematoma in Patients with a History of Automotive Accidents: A Longitudinal Comparative Study

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ABSTRACT

Aim: To determine the impact of operating time on the surgical outcome of epidural hematoma in patients with a history of automotive accidents

Study design: A longitudinal comparative study **Place and Duration:** This study was conducted at Pakistan Institute of Medical Sciences Islamabad, Pakistan. From June 2020 to June 2021.

Methodology: In this study, sixty adults of either gender who were involved in a road traffic collision and had an epidural hematoma were included. Three groups of 20 patients were formed. These patients were in groups I, II, and III, where the period from a traumatic event to surgery was less than one hour, one to six hours, or more than six hours, respectively.

Results: Only four out of the 20 participants in group I (about 10%) had an adverse result. A total of 11 (30%) of the participants in group II had a positive result, while others had a negative result. There were 10 (50 percent) positive outcomes and 10 (50 percent) negative outcomes in group III. A P-value of 0.05 indicated a link between operation timing and patient outcomes

Conclusions: Patients who had surgery within an hour of the head trauma had a much greater success rate after surgical evacuation of epidural hematoma.

Keywords: Epidural hematoma, neurosurgical emergency, time of surgery for epidural hematoma, Road traffic accident, Traumatic brain injury.

Introduction

Epidural hematoma is the medical term for an accumulation of blood outside the dura mater. There is a characteristic presentation for an epidural hematoma 1. An episode of transient amnesia occurs after the event. It is a period of lucidity lasting many hours. Opposite side hemiparesis, obtundation, and ipsilateral pupillary dilation are some other presentations. Accidents involving a bicycle or a fall from a great height are the most prevalent causes of injury. Other areas of supratentorial epidural hemorrhage, such as those seen in the temporal region, are regarded anomalous. The conventional therapy for a large

epidural hematoma in a trauma patient is immediate surgical intervention.

Glasgow Coma Scale score or state of consciousness upon admission, age, and accompanying intradural lesions, as well as the period of time it takes to evacuate a hematoma once a patient is transferred to a neurosurgical unit, are the most important variables impacting the prognosis 2

. Total 87 percent of patients who arrive at the hospital soon after a car accident and having a good GCS (13 to 15) have a good result, whereas 9 percent have a bad score 3.

The period of time it takes from the moment of injury until the hematoma is surgically removed is referred to as the “time is taken”. When the condition is diagnosed and treated early, the risk of death and long-term illness is minimized. If surgery isn't done quickly enough, most individuals with epidural hematomas can die. Epidural hematoma patients are often thought to appear late due to their lack of knowledge, neglect, or lack of services in the immediate area 4

. Our study's key goal was to see whether the length of time it took to perform surgery on patients with epidural hematoma from car accidents affected the surgical result.

Methodology

This study was conducted at Pakistan Institute of Medical Sciences Islamabad, Pakistan. From June 2020 to June 2021. Permission was taken from the ethical review committee of the institute. The study included sixty adult patients of either gender with an epidural hematoma volume greater than 20 mL. (Calculated by the scale on axial images of CT scan brain). Patients with epidural hematoma (a kind of traumatic brain injury in which blood accumulates between the dura mater and the skull) who were involved in road traffic collision were selected using non-probabilistic purposive procedures regardless of the Glasgow Coma Scale (GCS) score. Patients with diffuse axonal injury, subdural hematoma, or brain contusion, as well as cases of EDH associated with the history of fall or assault, were excluded from the study. Trauma to hematoma surgical evacuation was defined as a time period beginning with the occurrence of the damage and ending with its surgical removal. Three months following surgery, the results were divided into two categories: favorable and unfavorable. A favorable outcome was defined as a good recovery (ability to return to work or study) or a minimal handicap (Able to live independently; unable to return to work or school). Serious handicap (inability to accept commands/inability to live independently) was classified as a bad outcome, as was a vegetative state (inability to engage with the environment; inactivity). The patient's medical history was thoroughly reviewed and a comprehensive evaluation of the central nervous system was conducted to determine the patient's preoperative condition. Recorded GCS scores were used to categorize patients into mild, moderate, and severe head injuries, respectively, based on their GCS scores. Informed consent was obtained for participation in the study after a preoperative evaluation. All 60 patients were randomly assigned to one of three groups based on a lottery system. Those in group I was who had less than one hour from the time of the injury to surgery to remove the hematoma. Those in groups II and III were those who had more than six hours between the time of the injury and surgery to remove the hematoma. Following a three-month follow-up period, the final result was evaluated to determine if it was positive or not. Telephone contact was used to assure follow-up. A premade proforma was used to gather data, and the findings were produced. SPSS version 23.0 was used for data analysis. For qualitative variables like gender and ultimate result, the frequency and percentage were calculated across three groups. We performed Chi-square tests in three groups to examine the influence of surgery time on their outcomes. Statistical significance was defined as a p-value of 0.05 or less.

Results

In group I, there was 20 patients with a mean age of 32.4 years and a standard deviation of 13.37. (SD).

The 20 patients in Group 2 had a mean age of 33.05 years plus a standard deviation of 10.36. Twenty patients in group III had an average age of 34.6 years and a standard deviation of 13.98. The outcome is analyzed three months later to determine if it was positive or negative. According to our operational definition, 18 (90%) of the 20 patients in group I had a favorable outcome, whereas two (10%) had an adverse outcome. A total of 14 (70%) of the 20 (100%) patients in group II had a favorable outcome, while six (30%) had an unsatisfactory outcome. Ten (50%) of the twenty patients in group III had a satisfactory outcome, whereas ten (50%) had an unsatisfactory outcome. We assumed for our null hypothesis that the observed difference in the percentages of favorable and unfavorable outcomes across groups is statistically independent.

A chi-square test was used to evaluate the null hypothesis. The P-value of 0.022 (0.05) supported the rejection of the null hypothesis that the row and column variables are unconnected (that is, just randomly related) and that the observed difference between them is not statistically significant. The value of 7.619 for the chi-square was found. That is, the group I had a much higher percentage of favorable outcomes (surgery within one hour).

Discussion

Concussion-related epileptic delirium hypertension (EDH) is a rare but dangerous side effect of brain trauma. About 1 to 4 percent of people who have a severe brain injury, and about 5 to 15 percent of those who died, have this finding. ⁵The purpose of this research was to demonstrate the impact of operating time on the surgical outcome of epidural hematoma in patients with a history of automotive accidents. Our findings are in line with previous research. An investigation on the mortality and clinical recovery of 60 patients with acute epidural hemorrhage (EDH) after a closed head injury was conducted between 1978 and 1985 by Haselsberger K and his colleagues⁶. Acute EDH has a 25 percent fatality risk (Rehman, et al., 2007)⁷. Before surgery, a patient's preoperative level of consciousness and any brain lesions was shown to have a significant impact on the patient's prognosis. There were 17 deaths and 67 excellent recoveries in our research, whereas there were 65 deaths and 13 great recoveries after a two-hour period of time. When an acute epidural hematoma caused comatose patient Cohen JE et al⁸ to investigate whether the time interval between the beginning of anisocoria and hematoma evacuation operation was a meaningful predictor of prognosis. In this study, 21 patients with an acute traumatic epidural hematoma had a Glasgow Coma Scale admission score of less than 8 (Islam, 2011)⁹. In 14 (67 percent) of the people tested, anisocoria was found. Patients with anisocoria exhibited a threefold increased death rate compared to controls ($p = 0.21$, Fisher's exact test), however, this difference was not statistically significant. One patient died, but everyone with an anisocoria – craniotomy delay of fewer than 70 minutes survived. Individuals with a delay of more than 90 minutes between anisocoria and craniotomy died at a higher rate ($p 0.05$) than those with a latency of fewer than 90 minutes. According to the researchers' results, patients who have had an acute epidural hemorrhage may benefit from a shorter anisocoria surgery delay (90 minutes or less). Seelig JM et al¹⁰ investigated patients who had surgical intracranial decompression (SID) at the same institution in order to discover which characteristics led to their recovery. They examined the medical records of 82 consecutive individuals who received SID following the same procedure at the same facility. The time between injury and operation was an important aspect of the healing process. Patients who had surgery within the first four hours had a mortality rate of 30 percent, compared to 90 percent for those who had surgery after four hours. Among other factors, gender, multimodality evoked potentials, and postoperative intracranial pressure were all significant predictors of outcome (ICP)¹¹. Patients with traumatic ASDH should be moved to hospitals that can identify and remove hematomas within four hours after the event, according to the researchers¹². This would significantly lower the fatality rate. Researchers from the University

Hospital of Verona's Department of Neurosurgery evaluated 107 consecutive instances of epidural hematoma over a period of three years in order to determine the surgical outcomes 13. Total 5 percent of patients died, and 91 percent were able to return to their normal lives with few residual disabilities. 57 percent of their patients were operated within six hours after their accident, and 60 percent had a GCS score of 8 to 15 when they entered surgery. Patients who underwent surgery and had a GCS of 8 or above did not die; in fact, all patients who had surgery and had a GCS of 8 to 15 recovered completely (63 cases). A single dilated pupil was used for surgery on 25 patients, and all of them were able to fully recover¹⁴. When patients are admitted to the hospital, their chances of a positive result are reduced by half or fourfold if they are flexed or extended. Only 21% of the patients had a lucid period after the accident, despite the fact that 90% suffered skull fractures. Patients died in all five instances because of unnecessary mistakes committed by hospital personnel at outpatient facilities (in two cases) and inside their own department (3 cases) ¹⁵. There is a possibility of zero mortality from epidural hematoma if a contemporary system of treatment for head-injured patients is implemented, including prompt referral by community physicians and enough hospital capacity for continuous access to emergency neurosurgery¹⁶. In PWH, a Hong Kong University Hospital Trauma Center, Lawton et al. ¹⁷analyzed the incidence and mortality of traumatic EDH at the emergency department (ED). Total 90% of the patients who survived severe EDH had a Glasgow Outcome Score of 4 or 5, according to the researchers (good or moderate). In the presence of GCS 3, significantly early brain damage is indicated by bilaterally fixed dilation of pupils ¹⁸. Patients with cerebral hematomas who undergo emergency evacuation are unlikely to benefit from surgery¹⁹. The prognosis for GCS 3 EDH patients, even with the shortest feasible prehospital stay and early access to neurosurgery, remains low ²⁰.

Conclusion

Patients who had surgery within an hour of the trauma had a much greater success rate after surgical evacuation. For those who appear early but with bad GCS, in those cases time is not the sole element influencing a positive result; in these circumstances, other considerations must take precedence.

Funding source

None

Conflict of interest

None

Permission

Permission was taken from the ethical review committee of the institute

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Incidence of Coronary Artery Disease in Patients with a Zero-Calcium Score on Coronary CT Angiography: A Cross Sectional Study

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ABSTRACT

Aim: The objective of this study is to determine the incidence of CAD in patients whose Coronary computed tomography angiography (CCTA) results showed that their calcium levels had a score of zero.

Study design: The study design was a Cross sectional study. Place and duration of study: This study was conducted at Peoples University of Medical and Health Sciences for Women Shaheed Benazirabad Nawabshah, Pakistan from March 2019 to March 2020.

Methodology: The study population was a total of 90 patients, whose ages ranged from 18 years to 67 years. These patients were advised by their physicians to take a coronary CT angiography due to suspicion of coronary artery disease. The Coronary computed tomography angiography (CCTA) of the patients showed that their calcium levels had a score of zero. Patient diabetes score, their gender and the existence of coronary artery disease were treated as frequency and percentage in the graphical analysis on the SPSS software version 22. The co-founding variables of the study were stratified, and the chi-square test was applied on the cofounding variables after post stratification.

Results: The mean age of the study population was 51.63 ± 7.2 years. The study had 76 males which was 84.4% of the study population and 14 female patients which was 15.5% of the study population. A total of 41 (45.5%) patients had been previously diagnosed with diabetes. The results from the study showed that 7.78% (7) of the patients were diagnosed with CAD. A total of 83 people from the study population (92.2%) had normal coronary arteries.

Conclusion: The results from the research study concluded that 7.78% (7) of the patients were diagnosed with coronary artery disease and their calcium levels had a score of zero score on their Coronary computed tomography angiography (CCTA).

Keywords: zero-calcium score, CT angiography, coronary artery disease

Introduction

Coronary artery disease is spreading globally, and it is a serious disease which effects the lives of million people across the globe (1). According to a recent survey by the American heart association 217.1 people out of 100,000 died due to CAD (2). According to the World Health Organization an estimated of 17.9

million lives are lost each year due to CAD and it is one of the the most troubling and major causes of cardiac deaths worldwide (3). Studies and statistics have found that countries that help majority of the population living below the poverty line have more cases of patients with CAD. There is a gap in the research linking adults diagnosed with coronary artery disease in Pakistan and their mortality rate, however experts have stated that the a majority of the population is susceptible to coronary artery disease (4). According to a survey conducted by the national health department, one out of every three Pakistani who is over the age of 40 years has diagnosed or undiagnosed hypertension.

While first world countries have started to take control of this epidemic through the proper medication, diagnosis and the necessary modifications to their lifestyle, third world countries are still struggling to diagnose and provide the proper medication in order to stem the rise of deaths related this disease. One of the leading causes of death in the subcontinent proven by statistics obtained from a study show that , in third world countries, 3/4th of the deaths is due to coronary artery disease (5).

Coronary artery disease can be diagnosed by the presence of calcium present within the atherosclerotic arteries. This coronary artery calcium is measured by the coronary CT angiography which helps in diagnosing coronary artery disease (6). Many studies and experts globally have used the coronary artery calcium to predict the existence of coronary artery disease (7).

However additional investigation is needed to explore the significance of evaluating the coronary artery calcium scores to predict coronary artery disease. Studies have reported that 3 to 34% of the patients with a zero score on their calcium levels on their CCTA were diagnosed with CAD (8). Similarly, another study found that 13. 1% of patients with a zero score on their calcium levels coronary artery disease (9). However, there is still a gap in the research conducted in Pakistan about the relationship between patients with a zero-calcium score and CAD. This is at odds with the percentage of patients in Pakistan diagnosed with coronary artery disease.

The objective of this study was to determine from a CCTA, the number of patients with a score of zero on their calcium levels that have CAD. These results will give a better picture of patients with coronary artery disease having a zero-calcium score on the coronary CT angiography. However, it is important to note that while a zero-calcium score can be an indicator towards the presence of coronary artery disease it is not a 100% reliable or foolproof method to diagnose coronary artery disease, which is why the study is important for determining what percentage of patients with a score of zero on their calcium levels have CAD (10).

Methodology

A total of 90 patients were referred from the outpatient department to evaluate the existence of CAD. Consent was taken from all these patients and the study proceeded after getting the approval of the ethical committee of the institute. Patients with only a zero score of their calcium levels on their CCTA were included in the study. The study included patients whose ages ranged from 18 to 67 years. These patients were advised by their physicians to take a coronary CT angiography due to suspicion of CAD. The CCTA of the patients showed a zero-calcium score. This study had an exclusion criterion for patients who had heart disease, myocardial infraction, where under suspicion of ACS, previously had a coronary artery bypass, and patients who had chronic or acute kidney disease. The data of these 90 patients was analyzed using the SPSS software version 22 in order to establish the frequency of patients who had coronary artery disease. At the time of admission in the hospital, patient history was taken which included their demographic data. Patient diabetes score, their gender and the existence of coronary artery disease were treated as frequency and percentage in the graphical analysis. The co-founding variables of the study were stratified, and the chi-square test was applied on the cofounding variables after post stratification was done. For analysis the value of p was taken to be equal or less than

0.05 was considered. CAD was only diagnosed by a cardiologist with a fellowship experience of more than 10 years.

Results

The age of each patient in this study was noted and its mean was calculated to be 51.63 ± 7.2 years. The age range for the patients was between 18-67 years old. The study had 76 males which was 84.4% of the study population and 14 female patients which was 15.5% of the study population. A total of 41 (45.5%) patients had been previously diagnosed with diabetes. The results from the study showed that 7.78% (7) of the patients were diagnosed with coronary artery disease. Total 83 patients (92.2%) had normal coronary arteries. The results showed that age and gender did not affect existence of CAD. Whereas 5 patients who were diagnosed with diabetes mellitus were also diagnosed with coronary artery disease and the remaining two patients with coronary artery disease were non-diabetic. The results did show that the frequency of patients diagnosed with CAD and diabetes mellitus was high however no statistical significance could be formed between the two. Coronary artery disease was diagnosed in 4 male patients and three female patients however since the value of p was 0.17, it was not taken as a statistically significant value.

Table 1: Frequency of patients with CAD according to gender

| Gender | Coronary Artery Disease | | P- Value |
|--------|-------------------------|----|----------|
| | Yes | No | |
| Male | 4 | 72 | 0.17 |
| Female | 3 | 11 | 0.17 |

Table 2: Frequency of Diabetic patients with CAD

| Diabetes Mellitus | Coronary Artery Disease | |
|--------------------------------|-------------------------|----|
| | Yes | No |
| Diabetic Patients (n = 41) | 5 | 36 |
| Non-Diabetic Patients (n = 49) | 2 | 47 |

Table 3: Frequency of patients with CAD

| Number of patients (n=90) | Coronary Artery Disease | |
|---------------------------|-------------------------|----|
| | Yes | No |
| Patients (n = 90) | 7 | 83 |

Discussion

This study showed that there was a statistically low number of patients who were diagnosed with coronary artery disease and had a zero-calcium score. In our study a total of 7.78% of the patients had coronary artery disease and had a zero-calcium score. A similar strategy conducted, on the frequency of patients with coronary artery disease who had zero calcium score on their coronary CT angiography, show the percentage of 1.7% (11). Another study concluded that an estimated 8.2% of

patients were diagnosed with coronary artery disease having a subset of zero calcium score (12). These studies have been conducted that explored the frequency of patients with coronary artery disease and the link with having a zero-calcium score on a coronary CT angiography, however there are differing results based on their demographics and geological location. Some studies found a higher prevalence of coronary artery disease such as 34% whereas other studies found a relatively lower prevalence of coronary artery disease (4.5%) in patients with a zero-calcium score on their coronary CT angiography (13).

CTCA, without a doubt, provides a thorough assessment of coronary artery disease, including plaque demonstration and stenosis measurement, resulting in improved accuracy in diagnosis and prognosis (14). CTCS, on the other hand, is a rudimentary approach that is significantly easier to perform because it does not require contrast or beta-blockers, and it also takes less time to report (15). CTCS was suggested as the first test to rule out coronary disease in low-risk individuals in the 2010 nice chest pain guideline, however the newly updated recommendation recommends CTCA as the first line examination for all patients with angina, regardless of CTCS (16). Our findings show that up to 50% of individuals with conventional or atypical angina will have a ZCS with a favorable prognosis. Our findings show that up to 50% of individuals with conventional or atypical angina will have a ZCS with a favorable prognosis. Although the absence of calcium does not rule out the occurrence of coronary artery disease, our findings imply that it is associated with a very low risk of obstructive lesions (17). This was especially true in patients with low and intermediate pre-test coronary artery disease risk, as evidenced by a study in which the prevalence of obstructive coronary artery disease was only 3.6 and 4.2 percent in patients with low and intermediate pre-test coronary artery disease risk, respectively, in the absence of calcium (18). This is consistent with the great prognosis seen in patients who have a calcium score of zero. About 5.81 percent of the stable patients referred for a potential cad investigation who had a calcium score of zero had obstructive coronary artery disease (>50 percent stenosis) (19). As a result, while the zero-calcium score does act as an indicator for Coronary artery disease, it does not always indicate the existence of CAD (20).

Conclusion

The results from the research study concluded that 7.78% (7) of the patients were diagnosed with coronary artery disease and had a zero-calcium score on their Coronary computed tomography angiography (CCTA).

Permission:

It was taken from the ethical review committee of the institute

Funding source:

None

Conflict of interest:

None

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Relationship between Levels of Some Physiological Parameters and Retained Placenta in Local Cows

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ABSTRACT

The present study was carried out to investigate the effect of retained placenta in local cows on (zinc, Magnesium, calcium, β -carotene and vitamin A) and some hematological parameters. A total of forty cows were used in this study from fields in Al-Shirqat city, divided into two groups, the first group include thirty cows suffers from retained placenta and the second group include ten cows with normal parturition represent the control group. They were at age 3-5 years. Their body weight ranged between 150-180 Kgm. We noted in this study that (zinc, calcium, β -carotene and vitamin A) decreased significantly ($P \geq 0.05$) in group suffers from retained placenta in compare with healthy group, except Magnesium there is no significant difference between studied groups. Regarding hematological parameters (fibrinogen (Fb), packed cell volume (PCV), hemoglobin (Hgb), number of white blood cells (WBCs) and red blood cells (RBCs), we noted that (WBCs) increased significantly in the infected group in compare with healthy group, while other hematological parameters decreased significantly in the infected group in compare with healthy group except that (PCV) don't differ significantly between two studied groups. We conclude from this study that retained placenta (RP) has adverse effect on the level of some minerals and some hematological parameters.

Key words : retained placenta, local cows

Introduction

Retention of the fetal membranes (RFM) comprises of failure of dehiscence and a lack of expulsion of fetal membranes within the duration of physiological third stage of labour (1). Primary retention of fetal membranes results from a lack of detachment from the maternal caruncles whereas secondary retention is related to a mechanical difficulty in expelling already detached fetal membranes e.g. uterine atony (2). Retention of the fetal membranes (RFM) or Retention of Placenta (ROP) in the cow is normally defined as the condition in which the fetal membranes are not expelled within a period of 12 hours after expulsion of the fetus (3). Failure of the placenta to be expelled during the third stage of labour is a common postpartum complication in ruminants particularly in cattle which is due to failure of the fetal villi to detach themselves from the maternal crypts (4). Retention of fetal membranes is one of the most common conditions occurring in dairy cows following parturition. It is commonly followed by delayed involution of the uterus; drop in milk production and infertility resulting in economic loss to the owner (5). Retention of placenta has been associated with a vast range of factors such as abortion, forced labor, delayed gestation, early parturition, uterine atony, infections, and seasonal and hormonal disorders. In addition, it is well known that deficiencies of some vitamins and minerals induce or predispose animals to ROP (6). Calcium concentration, which maintains adequate contraction of the uterus, may cause ROP, increase the risk of dystocia and delay the involution of the uterus (7).

Metritis and pyometra are more common occurrences in such animals where the placenta is not removed manually. However, manual removal has been opposed as it may favor the entry of infection, which may be more harmful. Premature induction of parturition with glucocorticoids and prostaglandins increases the cases of placental retention. Moreover, it may be caused as a result of low plasma estrogen concentration. Deficiency in vitamin E and selenium also has an impact on retention of placenta (8). The Chemotactic activity of the placental tissue immediately after parturition determines placental expulsion and may even be a decisive factor. Major Histocompatibility Complex (MHC) incompatibility between dam and calf would facilitate the expulsion of placenta and accordingly MHC compatibility would be associated with retention (9). In order to study the relationship between levels of some physiological parameters and retained placenta in local Iraqi cows we designed this study.

Materials and methods

Blood samples were collected from (40) cow from fields in Al-Shirqat city, divided into two groups, the first group (30) cows suffers from retained placenta and the second group include (10) cows with normal parturition represent the control group. Blood was withdrawn from the Jugular vein by using sterile syringes (20 ml) after sterilization of the area well before blood withdrawing. Blood was divided into two parts the first part (10 ml) placed in test tubes that contain anti-coagulation factor in order to measure hematological parameters and another part placed in test tubes did not contain anti-coagulation factor and these samples were at 2500 round/minute (rpm) for 15 minute and then serum sample were stored in freezer at -18°C until they were used for biochemical tests.

The study period lasted from 1/4/2021 until 1/6/2021 and the tests were conducted in the chemistry laboratory of Munther Mustafa.

Serum Ca, Zn and Mg concentrations were analyzed with an atomic absorption spectrophotometer (Perkin Elmer 370 Model) (10). vitamin A and β -carotene levels were measured using spectrophotometric method (Schimadzu UV-1208, UV-VIS spectrophotometer) (11). Blood samples were used for evaluating plasma fibrinogen (Fb) level and complete blood count (CBC). The data related to hematological indices of CBC, i.e., packed cell volume (PCV), hemoglobin (Hgb), number of white blood cells (WBCs) by using (vet Hema-screen 18, Hospitex Diagnostics, Italy).

Statistical analysis

The results were analyzed using the SPSS program for values representing the standard rate and error and analyzed the data using the ANOVA Analysis of variance One Way. The differences between the groups were determined using the Duncan multiple range test. At a probability level ($P \leq 0.05$).

Results and discussion

Table (1) shows the affection of placenta retention on (zinc, Magnesium, calcium, β carotene and vitamin A) level and comparing its level with normal parturition cows

| Groups Parameters | Healthy parturition mean ±SE. | Parturition with retained placenta mean ±SE. |
|----------------------|----------------------------------|---|
| zinc (mg\dl) | 0.81 ± 0.04 a | 0.32 ± 0.02 b |
| Mg (mg\dl) | 2.14 ± 0.21 a | 2.19 ± 0.13 a |
| Calcium (mg\dl) | 9.78 ± 0.33 a | 6.12 ± 0.32 b |
| β-carotene (mg\dl) | 17.5±3.11 a | 9.6±1.95 b |
| vitamin A (mg\dl) | 52.2±2.44 a | 42±3.71 b |

Values represent mean ±SE.

- The difference between the values marked with various letters in the same line is significant (P≥0.05) .

We noted from our study that the level of (zinc , calcium , β-carotene and vitamin A) increased significantly (P≥0.05) in the healthy parturition group in compare with Parturitionwith retained placenta group except the level of Magnesium (Mg) there is no significantdifference between the two studied group . the differences among all studied minerals in bothgroups may be due to the relation between metabolic and puerperal disorders, and nutritiondeficiencies after parturition in cows. Minerals such as Ca, Zn and Mg are obtained from thediet and play an essential role in metabolic and physiological activities (12). Zhang et al. (13)suggested that Zn and Mg concentrations of the blood serum in the RP group prior toparturition and after parturition were lower than those in the control animals. Otherresearchers (14) indicated that low levels of minerals lead to a predisposition to RP in cows.The reason for such a difference may be related to variations in feeding, breed and types ofthe dairy animals (15). It is well known that vitamin A and β-carotene deficiency causesnegative impacts on fertility and increases RP incidence in cows. In addition, abortion, nightblindness, increase in the birth of weak and sick calves, weakening the oestrus symptoms, anddelay in ovulation are other negative outcomes related to deficiency of vitamin A and β carotene (16). Ineba et al. (17) found that there was no significant difference in plasmavitamin A levels between Holstein cows with and without RP when measured on the day ofparturition and one day postpartum, but the plasma β-carotene levels were significantly lowerin cows with RP.

Table (2) shows the affection of placenta retention on hematological parameters level and comparing its level with normal parturition cows

| Groups Parameters | Healthy parturition mean ±SE. | Parturition with retained placenta mean ±SE. |
|--|----------------------------------|---|
| RBC (×10 ⁶ cell/ml ³) | 6.15 ± 1.32 a | 5.30 ± 1.22 b |
| PCV (%) | 37.19 ± 1.11 a | 36.10 ± 1.15 a |
| Hb (g\dl) | 13.22 ± 1.23 a | 11.10 ± 1.12 b |
| WBC (×10 ³ cell/ml ³) | 7.7 ± 1.44 b | 9.5 ± 4.13 a |
| PLT × 10 ⁶ \ μl | 395 ± 12.45 a | 356 ± 13.02 b |
| Fb mg/dl | 813 ± 15.13 a | 463 ± 13.61 b |

- Values represent mean ±SE.

The difference between the values marked with various letters in the same line is significant (P≥0.05) .

In many studies, blood sampling uses for evaluating many criteria like total leukocyte count may be helpful to indicate infectious disease. However, using total leukocyte count to detect infection is not informative enough in cattle like many other species. The cows in two groups from each farm were selected as the same age, Blood samples were collected from the jugular vein of two groups to determine hematological indices of PCV, Hb, WBCs, RBCs, and PLT. In this study, we noted that cows with RP suffering from anemia as indicated by the significant decrease in the RBCs, Hb, PCV and other hematological profiles and also there is a leukocytosis. The condition may be attributed to inflammation and increase of monocytes for scavenging of cells debris as a revealing by (18). On the other hand, another researcher agreed with our results and he suggested that RP improves adhesion and antimicrobial capacity and enhances the inflammatory response, Neither was the increase in WBC counts as a response to any inflammation in the body (19). The mentioned indices in this study should be used with caution in the week after calving because it could be difficult to distinguish between the physiologic status of calving and a pathologic inflammatory process (20). In individual animals, blood sampling for evaluating e.g. the total leukocyte count may be helpful to indicate infectious disease. However, using total leukocyte count to detect infection is not informative enough in cattle like many other species and we noted that increase in the number of white blood cells in our study (21). Fb is involved in blood coagulation as a precursor to fibrin, binds to red cells, and reduces their surface charge leading to cell aggregation. It is also involved in tissue repair, providing a matrix for migration of inflammatory cells, fibroblasts, and endothelial cells (22). Fb has been used for many years as an indicator for inflammatory diseases such as RP as well as other inflammatory diseases in cattle (23). We noted that Fb decreased in the infected group in compare with control group and this case may be attributed to that Fb concentrations can remain unchanged or even decrease during an inflammatory condition. This may reflect consumption of the protein at the inflamed area (Uterine) in diseased cows which transiently can exceed the production. Measurement of Fb in cattle can be used to discriminate between acute and chronic inflammation, so the stage of disease can be evaluated better by monitoring more than one parameter (24).

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Molecular Prevalence of Triple Infection Hepatitis B, C and D Viruses in Sindh Pakistan

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ABSTRACT

INTRODUCTION: Viral hepatitis is one of the major health problems worldwide, particularly in South East Asian countries including Pakistan where hepatitis C virus (HCV) and hepatitis B virus (HBV) infections are highly endemic. Hepatitis delta virus (HDV) is also now emerging world-wide. HCV, HBV, and HDV share parallel routes of transmission due to which dual or triple viral infections can occur in a proportion of patients at the same time. HBV and HCV are important factors in the development of liver cirrhosis and hepatocellular carcinoma, while HDV infection also plays an important role in the liver damage.

PURPOSE/OBJECTIVES: The aim of this study was to find out the molecular prevalence of triple infection HBV, HCV and HDV in Sindh.

STUDY DESIGN: Cross Sectional Descriptive Study.

PLACE AND DURATION OF STUDY: It was carried out at Diagnostic & Research Laboratory LUMHS Hyderabad from June 2017 to September 2018.

MATERIAL AND METHODS/RESULTS: Whole Blood samples were collected in 5 ml vacutainer. Total 21816 samples were received from our laboratories/ collection centers located in 20 different cities of Sindh for detection of different Hepatitis viruses by PCR. Out of that 5335 samples were for HBV, 15366 samples for HCV and 1115 samples for HDV detection. Serum was used to extract DNA & RNA of HBV and HCV respectively by Abbott m2000sp and was amplified on m2000rt automated instrument using commercially available kits of Abbott, while for HDV extraction was done using Roche high pure vial nucleic acid kit & amplification was done using light cycler mix kit (Roche) on instrument z480 (Roche). Out of the total 5335 HBV samples 4275 (80%) were positive and 1060 (20%) were negative, out of the total 15366 HCV samples 8763 (57%) were positive and 6603 (43%) were negative, out of the total 1115 HDV samples 594 (52.3%) were positive and 521 (46.7%) were negative.

CONCLUSION: It is concluded that the only way to prevent these triple infections is by educating the general population by massive awareness programs, extensive vaccination and other preventive measures to stop the spread of these alarming diseases in Sindh, Pakistan.

KEYWORDS: HBV, HCV,

INTRODUCTION: Hepatitis is a Latin word which means inflammation of liver. Mostly hepatic infection is caused by single hepatic virus but sometime infection with multiple viruses may occur and it leads to different management problems, which leads to higher incidence of morbidity and mortality¹. Hepatitis B virus (HBV) infection is one of the most common causes of human death worldwide⁷. Approximately 2 billion people are infected with Hepatitis B Virus (HBV) globally, of which 350 million are chronic HBV carrier. Each year approximately 1 to 2 million people die from HBV related complications such as chronic hepatitis, cirrhosis and hepatocellular carcinoma². In Pakistan, it affects 5% or around 12 million people annually, out of which 1 develop hepatocellular carcinoma while four million, develop chronic hepatitis⁴. The infection rate of HBV has decreased significantly in developed countries unfortunately, in developing and under-developed countries including Pakistan, the infection rate seems to have not decreased, even to any appreciable level⁶.

Viral hepatitis is one of the major health problems worldwide, particularly in South East Asian countries including Pakistan where hepatitis C virus (HCV) and hepatitis B virus (HBV) infections are highly endemic. Of the six main viruses causing the acute form of the disease, Hepatitis C virus (HCV) causes a prolonged chronic form of the condition in susceptible patients¹¹. Hepatitis delta virus (HDV) is also now emerging world-wide¹.

All Hepatitis viruses (HCV, HBV and HDV) are transmitted via similar routes that are through blood or blood products. Major risk factors include Injection Drug Users (IDUs), blood transfusions, reuse of syringes, facial and armpit shaving by barbers, positive pregnancy, tattooing and unprotected sex, so as a result, dual infection and even triple infection (A condition in which all three viruses occur together in the same patient) can occur in some patients at the same time^{1,5,9}.

Co-infection is defined as the simultaneous presence of two or more infections by different pathogens which may increase the severity and duration of one or both⁸. HBV and HCV are important factors in the development of infection which leads to end stage liver diseases like cirrhosis and hepatocellular carcinoma (HCC)³, while HDV infection also plays an important role in the liver damage. Cases of triple viral infections are reported from different regions of the world; Mongolia is a country which is highly endemic for triple hepatitis viruses. Taiwan is another country which was previously reported as HBV and HCV endemic area but recent studies showed that now it is also endemic for HDV. It has been reported that triple viral infection does not cause the development of HCC but only one virus that dominates other two viruses in triple viral infection causes this condition of HCC¹.

OBJECTIVE: The aim of this study was to find out the molecular prevalence of triple infection HBV, HCV and HDV in Sindh province of Pakistan.

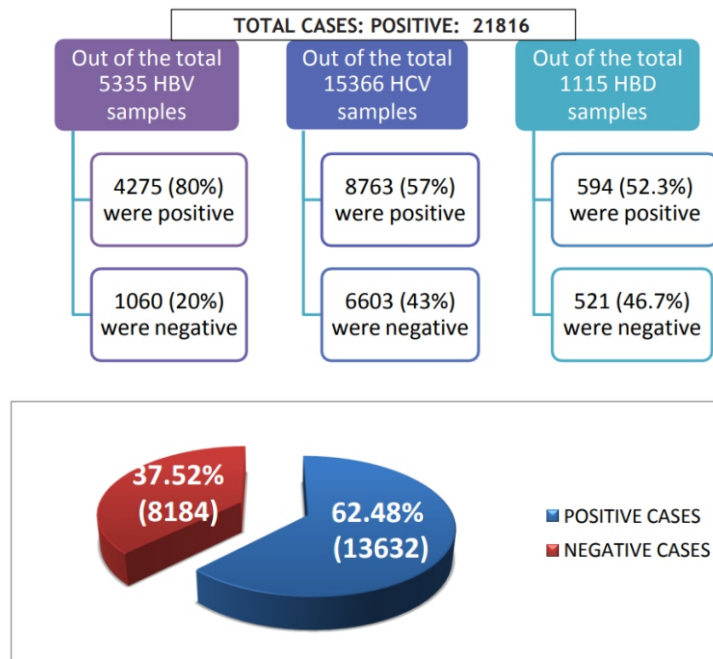
MATERIAL AND METHODS: This Cross Sectional Descriptive Study was conducted at Diagnostic & Research Laboratory LUMHS Hyderabad from June 2017 to Sept 2018.

METHODOLOGY: Whole Blood samples were collected in 5 ml plain vacutainer. Total 21816 samples were received from our laboratories/ collection centers located in 20 different cities of Sindh for detection of different Hepatitis viruses by PCR. Out of that 5335 samples were for HBV, 15366 samples for HCV and 1115 samples were for HDV detection.

All the samples were centrifuge on 5000 RPM for 10 minutes to get the serum; serum was used to extract DNA & RNA of HBV and HCV respectively by Abbott m2000sp and was amplified on m2000rt automated instrument using commercially available kits of Abbott. While HDV extraction was done using Roche high pure vial nucleic acid kit & amplification was done using light cycler mix kit (Roche) according to the manufacturer's protocol on instrument z480 (Roche)23

Statistics: Basic statistical tools were used for the analysis of data

RESULTS: Out of the total 5335 HBV samples: 4275 (80%) were positive and 1060 (20%) were negative, from 15366 HCV samples: 8763 (57%) were positive and 6603 (43%) were negative and from 1115 HBD samples: 594 (52.3%) were positive and 521 (46.7%) were negative.



TOTAL 360 cases were requested for dual hepatitis i-e HBV and HDV from them HBV+VE were 228 (63.5%) and HBV-VE= 132 (36.5%), HDV+VE=203 (56.3%) and HDV-VE=157 (43.7%).

TOTAL 390 cases were requested for dual infection of HCV and HBV from them HCV+VE were 219 (56.2%) and HCV-VE were 171 (43.8%), HBV+VE were 241 (61.8%) and HBV-VE were 149 (38.2%)

While 12 cases already positive as HBV were requested for HCV and HBD from that HCV and HDV +VE were 4 (33.33%) respectively and HCV-VE were 8 (66.66%) respectively

While only 10 samples were sent from different centers for detection of all three types of infections at one time from which 2 cases one each from Sukkur and Dadu were reported triple infection 4 cases 2 from Dadu and one each from Jamshoro and Hyderabad Saddar branch were reported having dual infection i-e HBV & HDV, 3 cases were reported single hepatitis HBV- 2 at our main branch in Hyderabad and one from Ghotki while a single sample was not detected any virus.

| HCV | HDV | HBV |
|----------------------------|--------------------------------|-----------------------------|
| 17080101367 Not Detected | 17080101367 Not Detected | 17080101367 Detected 39 |
| | | MAIN |
| 18010101876 Not Detected | 18010101876 Not Detected | 18010101876 Detected 146 |
| | | MAIN |
| 18020601605 Not Detected | 18020601605 Detected 1850000 | 18020601605 Detected 445 |
| | DADU | |
| 18021400088 Not Detected | 18021400088 Not Detected | 18021400088 Detected 13 |
| | | GHOTKI |
| 17110902432 Detected 400 | 17110902432 Detected | 17110902432 Detected 54,892 |
| SUKKUR | | |
| 17090303455 Not Detected | 17090303455 Detected 2,163,384 | 17090303455 Detected |
| | JAMSHORO | |
| 18040601643 Not Detected | 18040601643 Not Detected | 18040601643 Detected 184 |
| | DADU | |
| 18040602154 Detected 4,300 | 18040602154 Detected < 12 | 18040602154 Detected < 10 |
| DADU | | |
| 18080202096 Not Detected | 18080202096 Detected 396232 | 18080202096 Detected |
| | SADDAR | |
| 18100901434 Not Detected | 18100901434 Not Detected | 18100901434 Not Detected |

DISCUSSION / COMPARATIVE STUDIES/DISCUSSION: Traditionally, viruses have been classified

according to antigenic characteristics²⁰. There is a wide variation in the prevalence of Hepatitis worldwide¹⁰. Drug resistant viral strains are evolved due to increased use of anti-viral drugs to treat chronic hepatitis¹⁷. There is a geographical difference in patients infected with Hepatitis¹⁵. Pakistan is highly endemic with to all types of hepatitis. Studies are too limited to give a clear picture of the prevalence at the national level, especially among otherwise healthy individuals. Most previous studies targeted different small groups of individuals with some clinical indications, so they do not accurately reflect the overall prevalence in Pakistan.

The overall prevalence of HBV and HCV (Dual infection) in this study was 26.15%. A review study conducted by Ziauddin et al⁸ at Peshawar showed an overall prevalence of 13.5% in KPK. Another study conducted by Syed Saad Naeem et al¹⁴ reported an overall prevalence of 12.9% in general population of Karachi, while a study by Rubina Ghani et al²⁰ shows prevalence in largest province of Pakistan i.e. Punjab as 54.93%.

The prevalence of only HBV in this study is 80% while a study conducted by Zia Ur Rahman Awan et al² in KPK showed 50%.

The prevalence of only HCV in this study is 57% while a study conducted by Hakim St et al¹⁸ in Karachi showed 5.2% which is very low as compared to our study.

The prevalence of only HDV in our study is 52.3% which is less as compared to a study in Punjab by Zaid et al²² that states 88.81%.

While dual infection of HBV and HDV comes in our study as 56.3% in contrast to 70.5% stated by Crispim et al²¹ in Brazilian population.

CONCLUSION: It is concluded that the only way to prevent these triple infections is by educating the general population by massive awareness programs and by extensive routine vaccination / immunization for infants and high-risk individuals to stop the spread of these alarming diseases in Sindh, Pakistan. The other preventive measures which should be carried out in order to avoid development of triple infection can be: Screening of donated blood, Practicing safe sex, Avoiding sharing razors, syringes, tooth brushes, nail clippers, or needles, when getting a manicure, a tattoo, or having any body part pierced.

LIMITATIONS: The inclusion of only those patients who came to our centers prescribed by the physician's, who presented with symptoms. Non-availability of any medical history regarding already having any hepatitis virus and came for other types. The findings may, therefore, not be generalizable to other patient populations, the study findings should be useful to health professionals and planners underscoring the importance of HBV/HCV co-infection during screening, monitoring, planning treatment and prognosis.

FUTURE DIRECTIONS: Further research is needed to better understand the pathophysiology, clinical presentations, developing proper screening tools, best possible treatment regimens for patients with HBV/HCV co-infection in order to reduce morbidity and mortality associated with condition. Where the HCV genotype determination facilities are available, the particular genotypes involved in causing infection must be determined before starting treatment. We also need to have similar studies at a national level to determine the overall prevalence and incidence of hepatitis infections in Pakistan.

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COMPETING INTERESTS: The authors have no conflict of interests.

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