

Does HCV Seropositivity Affect Short Term Postoperative Clinical Outcome In Intertrochanteric Fracture Femur? A Retrospective Study at a Tertiary Care Center

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ABSTRACT

Background: The influence of hepatitis C virus (HCV) infection on outcome of hip fracture surgery has never been studied in the past despite increasing incidence of infection as well as osteoporotic hip fractures. The purpose of our study was to evaluate the correlation between hepatitis C and perioperative outcomes of intertrochanteric fractures in elderly.

Method: This was a retrospective study carried out in a tertiary care center where five years data of peri and postoperative outcome of intertrochanteric fracture HCV +ve and matched control in a ratio of 1:2 were studied. The medical and surgical complications of the two groups along with the clinicoradiological outcome were evaluated using t test, odds ratio and confidence intervals ($p < .05$).

Results: Amount of blood loss during surgery and consequently blood transfusion was significantly higher in HCV+ve group (255ml:185ml and 19:9 units respectively). Duration of hospital stay was 33% higher in the seropositive group. Persistent oozing and superficial site infection were 5 and 2 fold higher than control group. Initial Harris Hip Score was significantly better in control group (74.9:67.1) whereas at 9 months the difference was insignificant (81.2:79.2). Clinical milestones like weight bearing and walking on stairs were

achieved earlier in control group and time of fracture union was convincingly earlier in the control group (5.5:7.2 months).

Conclusion: This is one of the initial study showing intraoperative and postoperative complications are higher in HCV seropositive patients with intertrochanteric fractures along with prolonged hospital stay, low HHS at 3 months and delayed union.

Key words: Complications, Hepatitis C, Intertrochanteric Fractures.


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INTRODUCTION

In recent years, advances in antiretroviral therapy have improved the long-term perception of patients with the disease, with a 34% reduction in hepatitis C-related liver disease over the next decade.¹ As patients with hepatitis C age, the need for selected surgical procedures, which include Orthopaedic trauma, osteoporotic hip fractures and joint replacement surgeries, are expected to increase. The incidence of hepatitis C infection among orthopaedic surgeries has been estimated at 3.3%. However, a recent study of American veterans performing arthroplasty has found that 8% of patients have serological evidence of previous or current hepatitis-C infection, and half of these patients have active infections during surgery.² In addition, hepatitis C infection is a common disease among patients receiving Total Joint Arthroplasty (TJAs). Despite this large

number of patients, we know only a few studies that have shown the effects of complete arthroplasty combined among patients with hepatitis C but there are no studies on outcome of trauma surgery in patients with hepatitis C.^{3,4} To our best of knowledge this is the first study focusing over outcome in intertrochanteric fractures in HCV positive elderly patients.

MATERIALS AND METHODS

Study Design: This was a retrospective study conducted at a tertiary care center comparing the HCV positive and matched control groups in terms of clinical outcome in unstable intertrochanteric fracture femur (IEC no. ERB/UCER/2020/2/28).

Data Collection: The data from June 2016 to July 2021 of patients with unstable intertrochanteric fracture femur treated with

closed PFN retrieved from the main OT, CR office (admission file) and Radiodiagnosis department regarding all the in-patient details. Apart from this the follow-up details were collected from the discharge card, OPD slip, follow up x-rays from Radiodiagnosis department along with the telephonic conversation on patient's personal contact number. The two groups so formed in terms of HCV positive and negative patients were compared in terms of intraoperative, postoperative complications along with functional outcome and radiological union on xrays.

Inclusion Criteria: All the non-treated HCV positive and HCV negative patients with unstable intertrochanteric fractures treated with closed PFN.

Exclusion Criteria: Stable intertrochanteric fractures, revision surgery, treated HCV patients, coinfection with HBsAg or HIV, coagulation abnormalities.

Operative Technique: All the procedures were carried out under fluoroscopy control following all universal precautions by two experienced surgeons. Patients were positioned supine on a radiolucent fracture table. Close reduction of proximal femur fracture was achieved with longitudinal traction applied in line with the axis of femur. Following routine skin preparation and draping, check close reduction of the fracture then percutaneous trochanteric entry point used, a long guide wire is passed through the femoral canal, proximal femur opened with an entry reamer, occasionally a reducer was used to aid fracture reduction. Nails were selected based on preoperative planning and were also checked intraoperatively to provide translational fill of the intramedullary canal in mid-diaphysis. The nail implants were then inserted; rotational position of the extremity was checked to prevent malalignment. The proximal interlocking helical blade of PFNA were inserted using the attached targeting device through stab incisions. All nails used were long and distal locking was performed using freehand technique through mini-incision.

Postoperative Management: All patients received antibiotic prophylaxis as per local guidelines. For thromboprophylaxis, low molecular weight heparin (LMWH) was administered subcutaneously until the patients were partially mobile. Patients were mobilized bed to chair on the second or third postoperative day whenever possible and supervised weightbearing was allowed as tolerated. Patient usually discharged on 5th postoperative day if no unexpected event occurred and then advised to follow up on 14th day, after 1 month, 3 months, 6

months and 1 year from day of surgery. Functional outcome in the form HHS score, radiological union in the form of xrays, blood requirement, hospital stay, and intraoperative and postoperative complications will be compared in both the HCV positive and HCV negative groups.

Statistical data analysis was performed using the Student *t* test, the Fisher exact test, and odds ratio to compare clinical outcomes and complication rates between the hepatitis C infected and the non-infected cohort. A *P* value of <.05 was considered significant for all statistical analyses.

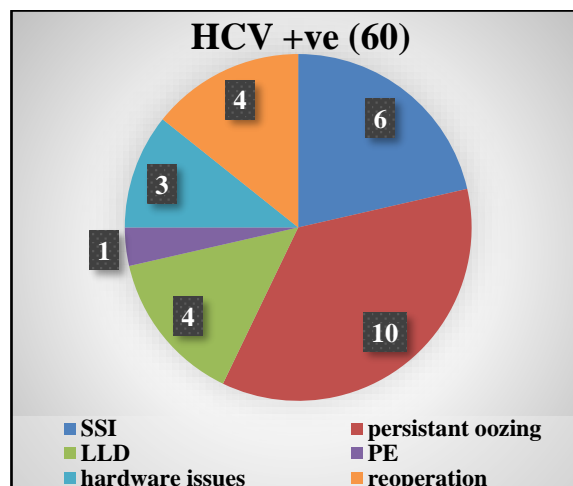


Fig 1: Sectoral distribution of complications in HCV +ve group.

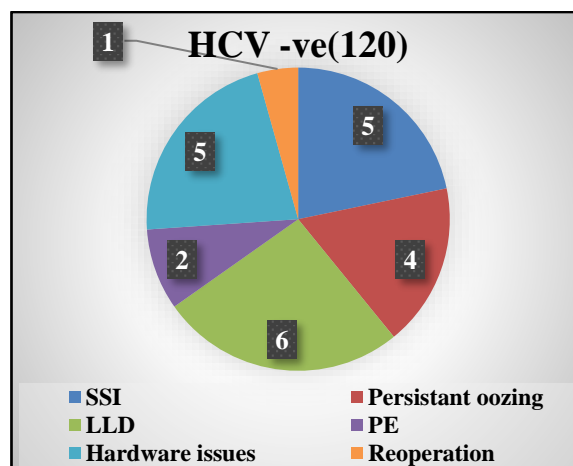


Fig 2: Sectoral distribution of complications in HCV -ve group.

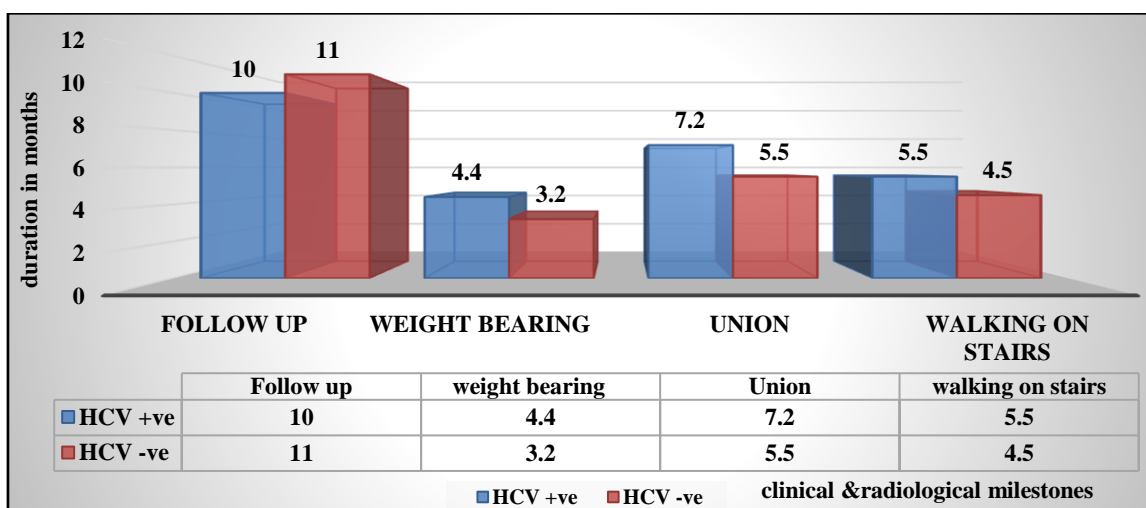


Fig 3: Comparative analysis of postoperative milestones in both the groups.

Table 1: Demographic and Intraoperative data

S.no.		HCV +ve Group	HCV -ve Group	P value
1	No. of patients	60	120	-
2.	Male: female	50:10	71:49	-
3.	Average age in years	52(22-81)	57(35-78)	
4.	AO type			-
	31A2.2	16	22	
	31A2.3	30	76	
	31A3.3	14	22	
5.	Singhs index <=3:>3	44:16	86:34	-
6.	Average prothrombin time (preoperative)	15 seconds (12-21)	12 seconds (10-16)	
7.	Av. Platelet count	195000/ μ l	221000/ μ l	-
8.	Av. Blood loss	255 ml (150-325)	185 ml (125- 310)	<0.009
9.	Av. Surgery time	62 min	55 min	0.10
10.	Blood transfusion (in units)	19 units	9 units	<0.05
11.	Postop Hb	8.7	9.6	<0.033
12.	Socioeconomic status	Upper lower (5-10)	Lower middle (11-15)	
13.	Av. Hospital Stay	9 days	6 days	<.05

Table 2: Comparison of surgical and medical complications

S.no.	Surgery/medical complications	HCV +ve group	HCV -ve group	P value
1.	Superficial site Infection	6	5	<.05
2.	Persistent oozing (after 6 days)	10	4	<.05
2.	DVT	2	3	-
3.	Limb length discrepancy 2 nd postop day (+><1cm)	4	6	-
4.	Pulmonary Embolism	1	2	-
5.	Urinary tract infection	5	5	-
6.	Mortality	1	2	-
7.	Implant related complications	3	5	-
8.	Reoperation (debridement)	4	1	<.05
9.	Culture report (most common organism)	MRSA	Klebsiella	-

Table 3: Functional outcomes in HCV +ve and HCV-ve PFNA2 Group

Surgery/ medical complications	HCV +ve group (n=60)	HCV -ve group (n=120)	P value
Harris Hip Score (100)			
3 Months	67.1	74.9	P<0.05
9 Months	79.2	81.2	P> 0.05
Radiological union (mean duration)	7.2 months	5.5 months	P<0.05

RESULTS

Out of 180 intertrochanteric fracture patients, 60 were HCV +ve and 120 constitute the control. Ratio of male to female was higher in HCV+ve group (5:1vs 2:3). Amount of blood loss during surgery and consequently blood transfusion was significantly higher (255ml:185ml and 19:9 units respectively). Duration of hospital stay was 33% higher in the seropositive group [table1].

The total number of complications per 60 patients were higher in HCV+ve group [table2]. Persistent oozing and superficial site infection were 5 and 2-fold higher than control group [chart1]. Reoperation rate was also significantly higher in HCV+ve group (8:1).

Initial Harris Hip Score was significantly better in control group (74.9:67.1) whereas at 9 months the difference was insignificant [table 3]. Clinical milestones like weight bearing and walking on stairs were achieved earlier (5.5:7.2 months) in control group and time of fracture union was convincingly earlier in the control group [chart 2].

DISCUSSION

The impact of HCV infection on outcomes following orthopaedic trauma procedures has not been studied earlier in a way that allows for adequate interpretation and application in the general population. There were a few studies in patients experiencing joint arthroplasty in HCV patients but they had their own limitations and insufficiently powered.³⁻⁶ Despite the high prevalence of hepatitis C in middle-income countries where the number of trauma cases are significant but literature still has to do for the first time about the effect on traumatized patients with hepatitis C infection.

The demographic and clinical characteristics of our patients with HCV were comparable to control group and previous records in the literature which strengthened the external validity of our results.^{3,4,7} Average blood loss and allogenic blood transfusion were higher in HCV+ve group. Perioperative morbidity and complications were higher in concordance with the other studies, but the previous studies were conducted in arthroplasty and spine surgeries.⁶⁻¹⁰ The combination of small vessel vasculitis and

disrupted liver, kidney, hematologic, and immune function impairs the typical physiological responses to surgical procedures and increases the risk of surgical complications such as wound infection and impaired wound-healing.^{6,11} In addition to significant liver damage, HCV also damages endothelial cell and conceal the immune system which leads to a cycle of events that affect multiple major organs leading to endless number of medical and surgical complications.¹²⁻¹⁵

Surgical complications were found to be higher in HCV+ve group specifically Superficial Skin infection (SSI), persistent oozing and reoperation similar to previous studies conducted in arthroplasty patients.^{6,10,14} Prolonged hospital stay was observed in the seropositive group because of more postoperative complications which indirectly increases the economic burden. Early Harris hip score was significantly lower in HCV +ve group (67.1vs 74.9) whereas after a follow up of 10 months the difference was not remarkable. Radiological union was significantly delayed (7.2 months as compared to 5.5 months) in seronegative group) and so ambulation in HCV+ve group.

Bedemo et al and Lin et al found the deleterious impact of chronic HCV on BMD and fracture risk occurs even in the absence of advanced liver fibrosis or cirrhosis but with poorly understood mechanism laying down the future research possibilities.^{16,17}

To our knowledge, this is the first comprehensive study conducted on intertrochanteric fracture outcome in HCV patients including complications, hospital stay, functional score and radiological union. Despite several limitations in our study, the results from our study will add valuable addition to the existing literature as the previous data on HCV in Orthopaedic surgeries is scarce and conflicting.

LIMITATIONS

Smaller group with shorter follow up. Severity of HCV was not taken into account. Given the design of this study, we are unable to comment on the stage or duration of HCV infection, BMD, viral load, liver function tests and other laboratory markers, or treatments for HCV that patients may have received. Thus, the potential future research can unfold the role that these factors may play in influencing the risk of adverse events following hip fractures in seropositive patients.

CONCLUSION

Intraoperative and postoperative complications are higher in HCV seropositive patients with intertrochanteric fractures along with prolonged hospital stay, low HHS at 3 months and delayed union. An Orthopaedic surgeon should be aware of these findings and should discuss with the surgical patients during decision making process.

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