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Research Article

**EVALUATION OF FRACTURE TREATMENT IN THE POSITIVE IMMUNODEFICIENCY VIRUS PATIENTS**<sup>1</sup>Dr Farwa Javaid, <sup>2</sup>Dr Hafiza Bushra Khalil, <sup>3</sup>Dr Hafiza Tahreem Arshad<sup>1</sup>WMO, THQ Pindi Phattian<sup>2</sup>WMO, BHU 110-7R Tehsil Chichawatni, Sahiwal<sup>3</sup>WMO, BHU 36-12/L Tehsil Chichawatni Sahiwal

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**Abstract:**

**Objective:** This research work carried to assess the prevalence of the post-surgical infection, fracture nonunion and different risk factors responsible for infection in the positive patients of HIV (Immunodeficiency Virus).

**Methodology:** We retrospectively evaluated the HIV positive patients suffering from fracture treated with surgery in Orthopedic Department of Doctors Hospital, Lahore from June 2016 to April 2019. We also selected 50 more patients as control who were present with fractures but they were negative HIV patients. We reviewed the clinical information of the patients of both groups. We compared the prevalence of the post-surgical infections and fracture nonunion between the patients of both groups, we also evaluated the risk factors for the infections after surgery in the positive HIV patients.

**Results:** The prevalence of the adverse healing of wound and incision infection in group of HIV positive patients was much high as compared to the group containing negative HIV patients but there was no significant disparity between the patients of both groups ( $P > 0.050$ ). Multivariable regression examination showed that HIV medical category ( $P < 0.050$ ), category of CD4+ T-lymphocyte ( $P < 0.010$ ) and open fracture ( $P < 0.050$ ) were the common risk factors for the wound infection after surgical intervention but age, sex, duration of surgery, type of incision, emergency operation, count of albumin & lymphocyte were not the significant risk factors ( $P > 0.050$ ). We found no important disparity in the nonunion rate between the patients of both groups ( $P > 0.050$ ).

**Conclusion:** There can be healing of the incision and there can be unity of the fracture in majority of the positive HIV patients present with fracture. There was close association of the infections of wound after surgical intervention with the open fracture, category of CD4+ lymphocyte and HIV medical category. **KEYWORDS:** Intervention, prevalence, methodology, infection, wound, surgery, albumin, HIV.

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**INTRODUCTION:**

AIDS (Acquired Immuno-Deficiency Syndrome) as a result of human HIV infection in one of wide pandemics of the whole developed world [1, 2]. In only China, 4.340 hundred thousand people have infection of HIV and recently detected patients were 0.70 hundred thousand persons in the year of 2017 in our country [3]. Positive HIV patients may face malignancies due to humoral, cellular immunological and non-specific deficiencies [4, 5]. There are various research works present on the clinical findings of the orthopedic surgical interventions in the positive HIV patients. According to the findings of some authors, there is high rate of infection of wound and nonunion in the positive HIV patients as compared to the negative HIV patients [1, 6]. In one research work conducted on forty two positive HIV patients, Hao stated that there is no correlation of the HIV infection with the high rate of infections after surgery and nonunion of fracture [7].

Li stated in his research work that positive HIV patients got normal healing with no particular infection [3]. Some authors reported that there can be occurrence of implant sepsis after the internal fixation [5, 8], but in one other research work on ninety one positive HIV patients, Graham stated that internal fixation was secure and there was no enhanced danger of detection of implant sepsis [9]. But there are very frequent controversies. The rationale of this research work was to assess the prevalence of fracture nonunion and infections after surgery and to evaluate the risk factors associated with the infections after surgical interventions in the positive HIV patients to support the specialist to manage the best treatment strategies for such patients.

**METHODOLOGY:**

From June 2016 to April 2019, total 69 HIV patients treated surgically in Orthopedics Department of Doctors Hospital, Lahore. We reviewed the data of all these patients retrospectively. We reviews the clinical information like age of patient, sex, admission date, duration of surgery, hemoglobin level, count of lymphocyte, type of incision, count of CD4+T-lymphocyte, HIV medical category, co-morbidities after surgery, class of wound, type of surgery, wound infections due to surgery, outcomes and follow-ups. We included the patients with confirmed HIV infection who underwent fracture surgery, with proper medical records and they observed complete follow up for at least fifteen months. Enzyme-linked immune-sorbant assay was in use for the diagnosis of HIV condition. We excluded the patients suffering from other serious complications or with incomplete medical records.

We only included the patient present with single fracture. At the same time, we selected 50 negative HIV patients present with fractures as controls. Ethical committee of the institute gave the permission to conduct this research work and we obtained the written consent from every patient after describing him the purpose of this research work.

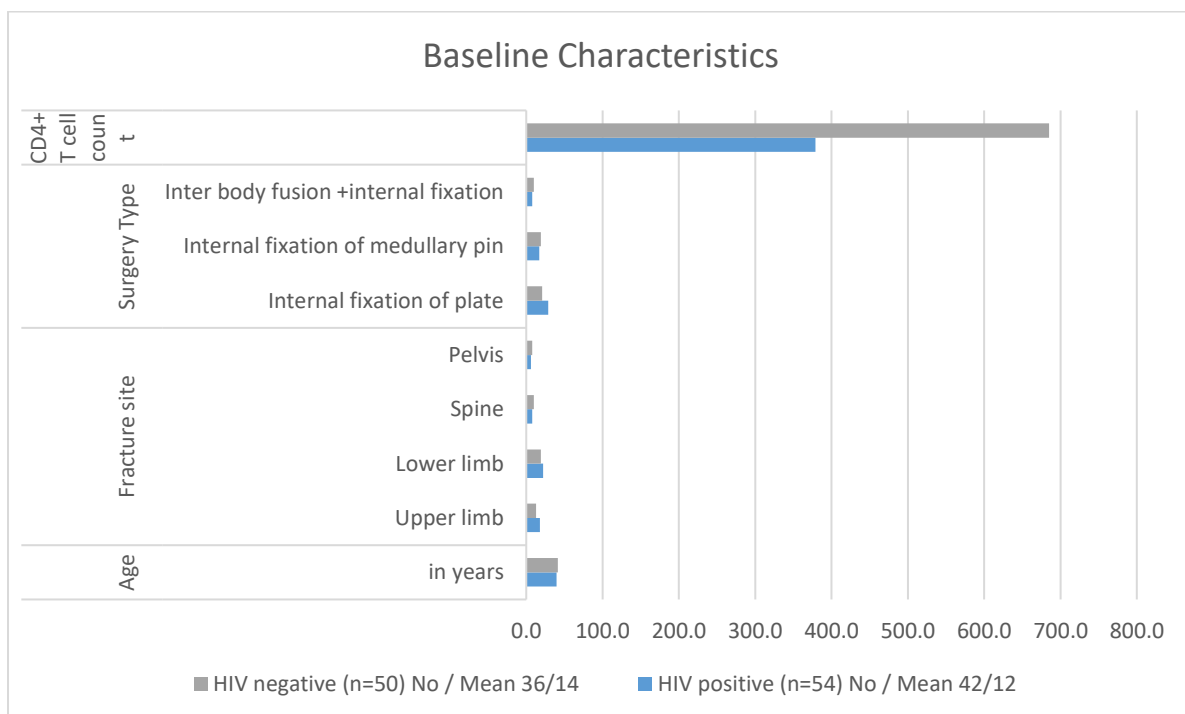
To assess the immune system condition of the patients with HIV positivity, count of the CD4+ T-cell was calculated and categorized into 3 different levels, < 200.0/ $\mu$ L, 200.0-499.0/ $\mu$ L and  $\geq$  500.0/ $\mu$ L. A count of CD4+ T-cell of < 200.0/ $\mu$ L show very high risk for the appearance of opportunistic infection [10]. We selected an authentic criteria for the diagnosis of the infections after surgical interventions [7]. When the patient was able to bear the pain free weight we considered it as fracture union [6]. SPSS V. 23 was in use for the statistical analysis if the collected information. We presented the continuous variables in averages and standard deviations. We used the Chi-square test for the presentation of the categorical variables. We used the multivariate regression analysis for the identification of the risk factors linked with the infections after surgical intervention. P value of less than 0.050 was the significant one.

**RESULTS:**

In current work, we excluded 15 patients who failed to fulfill the inclusion standard and we included only 54 patients in the positive HIV patients group. In positive HIV group, there were 77.80% (n: 42) male patients and 22.20% (n: 12) female patients. The average age of the patients was 39.60 years. In the group of controls, there were 72.0% (n: 36) males and 28.0% (n: 14) female patients with an average age of 41.50 years. All patients underwent internal fixation with surgical intervention. The baseline traits of the patients of both groups are present in Table-1. Count of CD4+ T-cell was much lower in the positive HIV group as compared to the group of controls ( $P < 0.050$ ). There was normal healing of incision in 41 patients and we observed adverse healing in 13 patients with redness of incision in 4 patients, discharge from wounds in 2 patients, fat liquefaction in only 1 patient, two patients with wound dehiscence and infection of incision in 4 patients. The rate of prevalence of adverse healing of incision and infection were 24.10% and 7.40% correspondingly. But in negative HIV group, we observed adverse healing in eight patients out of total 50 patients. The rate of prevalence of adverse healing of incision and infection were 16.0% and 4.0% respectively. The rate of adverse healing and infection of incision in the positive HIV group were much high as compared with the negative HIV patients.

**Table-I: The baseline characteristics of patients in the two groups.**

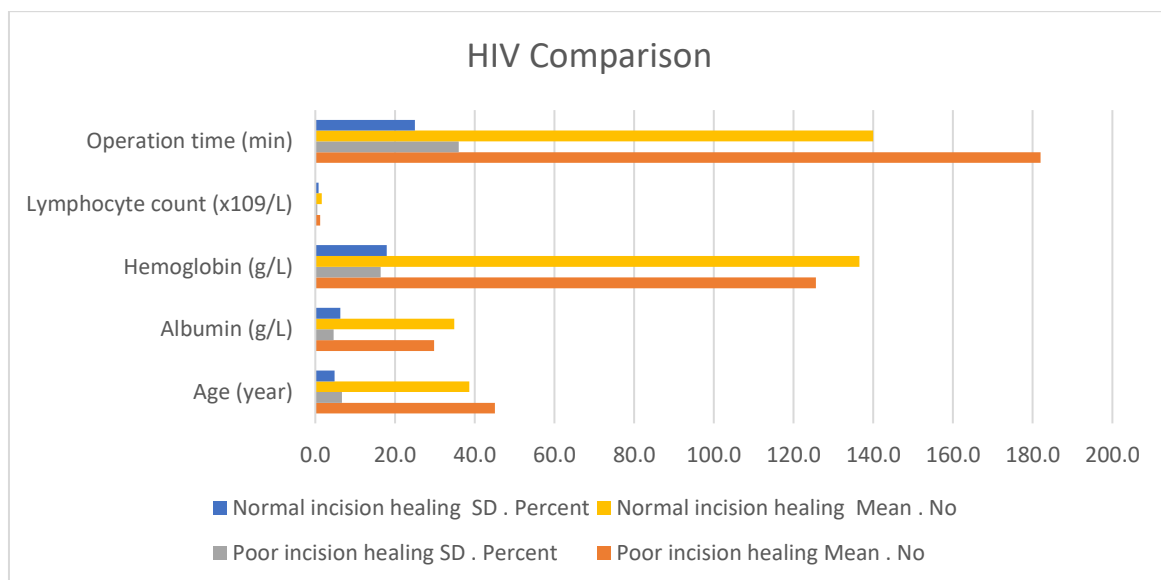
Variables		HIV positive (n=54)		HIV negative (n=50)		p-value
		No / Mean	Percent / SD	No / Mean	Percent / SD	
Gender	M/F	42/12	-	36/14	-	P>0.0500
Age	in years	39.6	7.8	41.5	6.3	P>0.0500
Fracture site	Upper limb	18.0	-	13.0	-	P>0.0500
	Lower limb	22.0	-	19.0	-	
	Spine	8.0	-	10.0	-	
	Pelvis	6.0	-	8.0	-	
Surgery Type	Internal fixation of plate	29.0	-	21.0	-	P>0.0500
	Internal fixation of medullary pin	17.0	-	19.0	-	
	Inter body fusion +internal fixation	8.0	-	10.0	-	
CD4+ T cell count		379.0	69.0	685.0	97.0	P<0.0500



We resolved all the complications with antibiotic treatment. We divided the positive HIV patients into subgroups of normal & adverse incision healing. The comparison among various variables in these subgroups is present in Table-2. We found significant disparities in the mentioned variable in both subgroups ( $P < 0.050$ , Table-2). After the surgery, in the positive HIV group there was failure of union of 3 fractures, 1 tibia and 2 humerus and we revised surgery to unite them. The rate of nonunion in the positive HIV group was 5.60% and in control group it was 2.0%.

**Table-II: The comparison between the two HIV positive subgroups.**

Variables		Poor incision healing		Normal incision healing		P-value
		Mean. No	SD. Percent	Mean. No	SD. Percent	
Age (year)		45.1	6.70	38.6	4.80	P<0.0500
Albumin (g/L)		29.8	4.60	34.9	6.30	P<0.0500
Hemoglobin (g/L)		125.6	16.40	136.5	17.90	P<0.0500
Lymphocyte count (x10 <sup>9</sup> /L)		1.2	0.50	1.6	0.80	P<0.0500
Operation time (min)		182.0	36.00	140.0	25.00	P<0.0500
CD4+ T cell category (n)	1	4.0	-	25.0	-	P<0.0500
	2	5.0	-	11.0	-	
	3	4.0	-	5.0	-	
HIV clinical category (n)	A	6.0	-	32.0	-	P<0.0500
	B	6.0	-	8.0	-	
	C	1.0	-	1.0	-	
Emergency operation (n)	Yes	9.0	-	13.0	-	P<0.0500
	No	4.0	-	28.0	-	
Open fracture	Yes	8.0	-	6.0	-	P<0.0500
	No	5.0	-	35.0	-	

**DISCUSSION:**

In this current research work, we emphasized on the assessment of the prevalence of infection after surgical intervention, fracture nonunion and different risk factors having association with infection after surgery in the HIV positive patients with infection. We discovered that the rate of prevalence of incision infection in positive HIV group was high but there was no important difference between the patients of both groups showing that the presence of HIV infection is not able to rise the incidence of the infection after surgical intervention. These findings are much same with the results of Li [3]. The prevalence of the

adverse incision healing in positive HIV patients was 24.10% which is much high than the 16.0% in control group. This finding was not similar with the results of research work conducted by Li. There was need of future research works on large sample size for the consolidations of findings on such issues.

Most of the studies have advocated some reasonable peri-operative adjuvant therapy as nutritional support, immune-modulators & anti-retroviral medicines [11, 12]. In one research work on 26 patients, Wijesekera proposed in open fractures administered with internal fixation that the rates of wound infection after surgical intervention were

high in the positive HIV patients as compared to their HIV negative controls [13]. Regarding the union of fractures, some research works stated that infection of HIV as well as its therapy have association with the altered density of bone mineral and enhanced avascular which rises the danger of fracture nonunion [14].

### CONCLUSION:

In this research work, the rate of nonunion in positive HIV group was 5.60% and in group of controls, this rate was 2.0%, though the prevalence in positive HIV group was high, there was no important difference between the patients of both groups. The results of this research work conclude that there was no association of the HIV positivity with the high risk of nonunion of fracture.

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