



Original Article

Comparison of Outcome in Immediate Vs Delayed Management in Patients with Gunshot Injuries to Face, A Prospective Study

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ABSTRACT

Facial injuries due to gunshot often comprise on bone and tissue destruction. The destruction or injury to facial muscle and bone depend on the category of weapon used. Surgical intervention must be done, but the timing for the surgical procedure delayed verses immediate closure surgeries are controversial. **Objective:** To compare the outcome of immediate and delayed closure of the facial injuries by a gunshot. **Methods:** A descriptive cross-sectional study consisting of 60 patients getting their treatment in Department of Oral and Maxillofacial Surgery, Mayo hospital, Lahore. Data were analyzed by SPSS version 20.0. Chi-square test was used to compare the results with p-value ≤ 0.05 as significant. **Results:** Age group on average was 21 to 60 years. Out of these 60 gunshot facial injury patients, 52 (86.7%) were males and 8 (13.3%) were females. Among these, patients managed with immediate closure after gunshot injuries were 44 (73.3%) and 16 (26.7%) were managed with delayed closure. Wound infection and wound dehiscence were compared in both groups. The mean wound defect size was found among patients 3.98 ± 1.30 cm. Statistically significant difference was observed for wound infection and wound dehiscence among both immediate versus delayed groups (p-value ≤ 0.05). **Conclusions:** In this study, we found that early management is better in terms of lower percentage of wound infection and dehiscence.

INTRODUCTION

Gunshot injuries to face are frequently encountered in hospitals. Both high and low energy injuries are encountered on the face due to firearms [1]. High velocity firearm injuries contribute to morbidity, mortality and social embarrassment due to devastating esthetic and functional consequences if mismanaged [2]. Knowledge of the head and neck anatomy, pathway of bullet and recognition of the type of injury are key factors for the

prognosis of patient's health. The wound is not the same from entry and exit, sometimes it is small from the entry but very dangerous from the exit [3]. Facial gunshot injuries mostly present with comminuted fractures, massive soft tissue defects, intraoral communication that later on result in the development of fistulas [4]. Gunshot wounds on the face of injured are mostly polluted and the patient may present at a time when considerable local tissue have

undergone necrosis to prevent infection and minimization of wound tension. Conflicting opinion was observed among researches as to whether immediate or delayed treatments should be done [5]. In some researches, early management of gunshot wounds results in better psychosocial profile, aesthetics, reduced hospital stay and early return to function. While in others, late repair followed by clean incisions of wounds in the past delayed management was advocated [6]. However, delayed reconstruction may lead towards permanent deformity in facial expressions and delayed wound healing [7]. Similarly, there are challenges while carrying out early intervention such as concomitant injuries to other parts of body, swelling, edema of soft tissues, loosened teeth, mobile bony fragments which may make treatment complex [8]. In high-velocity or blast injuries, primary or single stage surgery is not sufficient to clear the debridements; however, primary management is significant in soft tissue contracture and reassurance coverage for osseous reconstruction [9]. There are conflicting data regarding early and late closure of gunshot wounds. In a study conducted by Clark *et al.* shows insignificant difference between two treatment modalities [10]. The data shows 45.8% patients show complication (in terms of wound dehiscence or infection) with early intervention while 50% shows complications with delayed management with p -value > 0.05 .² However, another study shows that 58.8% patients presenting for immediate closure after gunshot injuries and only 20% of patients with early management came with complications of wound discharge and infection [11].

METHODS

Descriptive Cross-sectional study was carried out in the Department of Oral and Maxillofacial Surgery, Mayo Hospital, allied with King Edward Medical University Lahore, a tertiary care hospital. Sample size of 60 cases was calculated with 95% confidence level after gunshot injury. Non-probability Consecutive sampling technique was used. The diagnosis was on clinical basis selected from Emergency Department of Oral Maxillofacial Surgery, Mayo Hospital. An informed consent was obtained from them or their parents for using their data for research and procedure was explained to them. No ethical issues or risk involved to patient. Computed tomography had performed to assess bony defects and fractures of mid face, defect size or nature of injury was assessed clinically and radiographically. Correction of fractures had done with proper reduction and fixation. Fixation of the fractured bones had done with miniplates according to the standard guidelines. Patients presenting in hospital emergency were sorted to receive either immediate management for gunshot injuries

to face and placed in group A or delayed management were placed in group B. In group A, all patients having gunshot injuries to the face were reconstructed immediately within one week after injury with miniplates and skin grafts to close the facial skin defects if needed as the decision will be totally clinical and taken per operative. In group B, all patients having gunshot injuries to the face were managed after first week of injury. There was delay in management due to unavoidable circumstances such as patients presenting late after sustaining firearm injury, patients with poor general health until improved and those with severe concomitant. Follow up of patients done after two weeks and after one month for the assessment of complications i.e. wound. All this information was recorded on a predesigned proforma attached.

RESULTS

Data were entered and analyzed in SPSS version 20.0. Mean and standard deviation was calculated for quantitative variables like age of patient and defect size of wound and number of infections. There were total 60 patients with gunshot injuries to the face who were enrolled in this study after taking an informed consent. The mean age of the patients was 34.9 ± 11.04 years of which the minimum age was 21 year and maximum of 60 years. Out of these 60 patients 52 (86.7%) were males and 8 (13.3%) were females (Table 1).

Gender	Frequency (%)
Male	52(86.7)
Female	8(13.3)
Total	60(100)

Table 1: Frequency Distribution according to Gender

Patients who were present within first week of their gunshot injuries and managed with immediate closure were 44 (73.3%) and 16 (26.7%) patients were managed with delayed closure (Table 2).

Recovery	Frequency (%)
Immediate	44(73.3)
Delayed	16(26.7)
Total	60(100)

Table 2: Distribution according to no. of patients with Immediate closure

Wound infection was observed in 11 (18.3%) of total patients; among these 5 (11.4%) were examined in immediate closure group and 6 (37.5%) were came acrossed at delayed closure group. It was revealed that highest percentage of wound infection was noticed in delayed group and the difference between both groups was found statistically significant with the p -value = 0.021 (Table 3).

Number of patients with immediate closure		Wound infection		Total
		Yes	No	
Immediate	Count and % within number of patients with immediate closure	5(11.4)	39(88.6)	44(100)
Delayed	Count and % within number of patients with immediate closure	6(37.5)	10(62.5)	16(100)
Total	Count and % within number of patients with immediate closure	11(18.3)	49(81.7)	60(100)

Table 3: Comparison of Wound Infection between Immediate vs Delayed Closure

p-value=0.021(Statistically Significant)

A total of 4 (6.7%) face gunshot injury patients were observed with wound dehiscence post-operatively at one month follow-up out of which 1 (2.3%) vs 3 (18.8%) were treated for wound dehiscence in immediate versus delayed closure group respectively. It seems that risk is high in the delayed closure group and differ significantly with the immediate group i.e., p-value= 0.024 (Table 4) descriptive analysis was done to quantify the variables.

Number of patients with immediate closure		Wound Dehiscence		Total
		Yes	No	
Immediate	Count and % within number of patients with immediate closure	1(2.3)	43(97.7)	44(100)
Delayed	Count and % within number of patients with immediate closure	3(18.8)	13(81.2)	16(100)
Total	Count and % within number of patients with immediate closure	4(6.7)	56(93.3)	60(100)

Table 4: Comparison of Wound Dehiscence between Immediate vs Delayed Closure

p-value=0.024(Statistically significant)

DISCUSSION

The goal of this study was to assess the outcome of early surgical intervention versus delayed intervention in patients suffering from facial gunshot injuries in terms of complications associated with either treatment option. No local study has compared both early and delayed intervention. While the international data by Suominen and Tukiainen showed difference in results [12]. In one study there was insignificant difference between outcomes of two types of intervention while other study favors early intervention [13]. These conflicting results provide a rationale for our study so that we can assess which treatment option is better than other [14]. The soft tissue injuries need to be operated on time, Vitkus studied the immediate closure effects. The early repair of soft tissues also had proven significant findings in concomitant injuries. Also, the immediate closure corresponds with aesthetic improved results of surgical interventions. In our study 73% of patients undergone immediate surgeries and wound infections were 18.3% in them. Which is significantly less than delayed closure [15]. With the passage of time wounds of soft tissues get swelling, that make a split wound difficult to operate in primary closure. Also, the delayed wound closure harbors more infections. Also proven by our study 26.7% of patients were managed with delayed

closures and wound infections were 37.5% which was significantly high than immediate closure. Ideally, closure should occur within the first 8 hours after injury [16]. A meta-analysis done by Bhattacharya concluded that the management of facial injuries should be followed by immediate closure. The complex injuries can later be managed by secondary closure of complex tissues rearrangement [17]. Sociodemographic, cost effectiveness and cost analysis are important factors that are associated with a surgical intervention. The primary and immediate closure are found to be cost effective that the delayed closures due to cosmetology surgery involvement. Cost analysis was nor a parameter included in our study as the study setting was in government funded tertiary care hospital of Lahore [18]. Mitchener and Canham-Chervak proved definitive repair of bony and soft tissue injuries must be done in single operation. It improves the functional quality and outcomes of the wounds and in high-velocity or blast injuries, primary or single stage surgery is not sufficient to clear the debridement's; however, primary management is significant in soft tissue contracture and reassure coverage for osseous reconstruction [19]. Free flap reconstruction is done in patients who had complex facial injuries. Definitive primary closure must be done. And it decreases the number of multiple stage surgeries and reduce the morbidities and incidence of wound infections. In our study total of 4 (6.7%) face gunshot injury patients were observed with wound dehiscence post-operatively at one month follow-up out of which 1 (2.3%) vs 3 (18.8%) were treated for wound dehiscence in immediate versus delayed closure group respectively. It seems that risk is high in the delayed closure group and differ significantly with the immediate group i.e., p-value= 0.024 [20]. Contaminations and wound infections are not considered among surgical procedure managements, immediate or delayed, by the post-operative care proven to be the leading factors by certain researchers [21]. Tomotography and angiography, the two surgeries that have been found very beneficial for the cranio facial reconstruction of free flap for non-traumatic cases and for traumatic cases that have rather lower-extremity of the injuries, both the surgeries have not been found very beneficial or useful for other traumatic wounds [22] Aveta and Caseati have concluded that the general principles of the surgical procedure are very useful for less complex facial injuries of the soft tissues but for other patients with special cases have to deal with different proximities of the trauma of facial injuries, these special patients were evacuated to a level I trauma center, that enabled the gunshot and battlefield facial wounds to be managed with much discipline and with greater efficiency, just like other types of facial wounds [23]. Choosing

whether the patient must be treated with aggressive reconstruction of the wound or delayed reconstruction of wound depends on the patient and his condition, the moment when he is presented to the surgeon and last but not the least the surgeon's overall perspective and judgement of the wound. The major objective of the procedure was to restore function of the wounded part and this objective was achievable with careful and immediate planning and sharp and steady surgical moves of the surgeon and his team [24].

CONCLUSIONS

Injuries should be treated early as there is less chance of complications in terms of infection. Primary management of gun-shot wounds ensures undisrupted wound healing and decreases the incidence of morbidities, wound infections and shortens the hospital stay.

Conflicts of Interest

The authors declare no conflict of interest.

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