

Delayed Diagnosis Of Hand Injuries In Poly-Trauma Patients

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Abstract

Hand injuries represent 5-10% of emergency room visits in the U.S. with significant economic effects. Trauma patients are at high risk for delayed diagnosis of concomitant injuries, increasing hand injuries, with reports in the literature as high as 50%. Our goal was to examine the risk factors for and incidence of the delayed diagnosis of hand injuries at a Level 1 Trauma Center. A retrospective review was performed on all admitted trauma patients from 2000 through 2004. Patient demographics, GCS, GCS, injury specifics, length of stay, and timing of hand injury diagnosis related to admission date were noted. With an increase in ISS and a decreased GCS, trauma patients are increasingly at risk for delayed diagnosis of hand injuries with a concomitantly increased length of stay. As a delayed diagnosis of hand injuries has significant physical and economic implications for patients, every effort should be made to expedite diagnosis in the poly-trauma patient. A standardized evaluation of the trauma patient with a focused tertiary survey is mandatory, particularly with an altered mental status or multiple injuries.

Introduction

- Trauma patients are at a risk as high as 50% for delayed diagnosis of concomitant injuries and increasing hand injuries.
- Head injury and Glasgow Coma Score of ≤ 8 , a greater Injury Severity Score, and alcohol have been implicated as risk factors for missed injuries in poly-trauma patients.
- If diagnosis is delayed, patients may need a prolonged period of disability and longer hospital stays with associated increased cost.

Objective

- To examine the risk factors for and incidence of the delayed diagnosis of hand injuries at a Level 1 Trauma Center.

Methodology

- Retrospective review of admitted trauma patients with hand injuries from January 1, 2000 through December 31, 2004
- Patients were assessed for:
 - Age
 - Gender
 - Blood alcohol level
 - Glasgow Coma Score (GCS)
 - ISS scores were subcategorized into mild (<9), moderate (9-16), and severe (>16).
 - Injury Severity Score (ISS)
 - Mechanism, injury type
 - Length of stay (LOS)
 - Timing of hand injury diagnosis
- A multiple linear regression model was used to determine risk factors for delaying the diagnosis of hand injuries using SPSS 15.0.

Exclusion Criteria

- Isolated or consciousness hand injuries.
- Distal radius fractures

Results

- 36,526 patients admitted with 2736 with hand injuries. 730 patients met inclusion criteria.

Table 1: Demographics

	N	Mean
Age	730	45.08
LOS	730	6.96
Diagnosis of Injury (Hospital day #)	730	.51
ISS	730	13.04
ETOH	424	50.17
GCS	602	13.86

Table 2: Day of Hand Injury Diagnosis

Day	Frequency	%	Cumulative %
0	579	79.2	79.2
1	99	13.6	92.8
2	29	3.9	96.7
3	16	2.2	98.9
4	6	.8	99.7
5	3	.4	99.9
6	4	.5	100.2
7	4	.5	100.7
8	1	.1	100.8
10	1	.1	100.9
11	1	.1	101.0
12	1	.1	101.1
13	3	.4	101.5
15	1	.1	101.6
Total	730	100.0	

Table 3: Group Comparisons

Delayed Diagnosis	N	Mean	SEM	P-value	
Age	Yes	160	47.54	21.913	.140
	No	570	44.96	23.244	
GCS	Yes	190	13.90	4.027	
	No	535	14.55	2.699	<.001
ETOH	Yes	111	57.73	87.459	
	No	213	47.50	88.036	.500
ISS	Yes	100	17.57	10.204	
	No	570	12.81	8.740	<.001
LOS	Yes	160	10.41	11.024	
	No	570	6.98	7.684	<.001

Table 4: Logistic Regression Model (p<0.001)

Delayed Hand Injury Diagnosis	P value	Adjusted OR	95% Confidence Interval for Adjusted OR
Intercept	.954		
GCS	.635	.854	.877 .899
Age	.001	1.020	1.000 1.032
Severely Injured	.015	2.014	1.144 3.546
Moderately Injured	.000	1.890	.969 3.575
Mildly Injured			
Alcohol Use	.000	1.806	.965 3.417
No Alcohol Use			
Female	.057	1.810	.965 3.429
Male			

Table 5: Delayed Diagnosis by ISS Category Crosstabulation (p<0.001)

Delayed Diagnosis		N	ISS Category			Total
			Mild	Moderate	Severe	
Yes		60	20	27	16	160
	% within Delayed Diagnosis	31.2%	29.6%	48.1%	100.0%	
	% within ISS Category	14.4%	34.1%	58.4%	21.7%	
No		399	104	176	119	670
	% within Delayed Diagnosis	31.0%	18.0%	36.4%	100.0%	
	% within ISS Category	85.6%	75.9%	68.6%	70.3%	
Total		460	124	203	135	830
	% within Delayed Diagnosis	47.2%	55.6%	34.3%	100.0%	
	% within ISS Category	100.0%	100.0%	100.0%	100.0%	

Discussion

- 70.3% of patients were diagnosed on the day of admission, with 91.3% diagnosed by the following day.
- Patients with a decreased GCS and elevated ISS were noted to have a statistically significant delay in diagnosis.
- Length of hospitalization was also noted to be longer in the subset of patients with a delayed diagnosis of hand injuries.
- Metacarpal fractures were the predominant injury in our study and also the most likely injury to be initially missed.
- Motor vehicle collisions were the most common mechanism for injury in our patient population and the most common mechanism associated with a delay in diagnosis.

Limitations

- Retrospective review
- Unable to assess fracture outcomes or if patients require surgical intervention as a result of delay

Conclusions

- With an increase in ISS and a decreased GCS, trauma patients are increasingly at risk for delayed diagnosis of hand injuries with a concomitantly increased length of stay.
- Every effort should be made to expedite diagnosis in the poly-trauma patient.
- A standardized evaluation of the trauma patient with a focused tertiary survey is mandatory, particularly in patients with an altered mental status or with multiple injuries.
- In the subset of patients, however, a short delay in the diagnosis of hand injuries may be unavoidable.

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