

Delayed Diagnosis of Hand Injuries in Polytrauma Patients (Poster)

Joshua M. Adkinson MD
Lehigh Valley Health Network

Muhammad Shuja Shafqat MD
Lehigh Valley Health Network, Mohammad_S.Shafqat@lvhn.org

Sherrine Eid MPH
Lehigh Valley Health Network, Sherrine.Eid@lvhn.org

Marshall G. Miles DO
Lehigh Valley Health Network, Marshall.Miles@lvhn.org

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Published In/Presented At

Adkinson, J., Shafqat, M., Eid, S., & Miles, M. (2011, October 20-23). *Delayed diagnosis of hand injuries in polytrauma patients*. Presented at the 28th Annual Meeting of the Northeastern Society of Plastic Surgeons, Amelia Island, FL.

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Delayed Diagnosis Of Hand Injuries In Poly-Trauma Patients

Joshua M. Adkinson, MD, M. Shuja Shafqat, MD, Sherrine M. Eid, MPH and Marshall G. Miles, DO, Lehigh Valley Health Network, Allentown, Pa.

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, including 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 2009. Patient demographics, ISS, 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 including hand injuries.
- Head injury and Glasgow Coma Score of ≤ 8 , a greater Injury Severity Score, and childhood have been implicated as risk factors for missed injuries in poly-trauma patients.
- If diagnosis is delayed, patients may have 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, 2009
- Patients were assessed for :
 - Age
 - Gender
 - Blood alcohol level
 - Glasgow Coma Score (GCS)
 - Injury Severity Score (ISS)
 - Mechanism, injury type
 - Length of stay (LOS)
 - Timing of hand injury diagnosis
- ISS scores were subcategorized into mild (<9), moderate (9-16), and severe (>16).
- 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 conspicuous hand injuries.
- Distal radius fractures

Results

- 36,568 patients identified with 2736 with hand injuries. 738 patients met inclusion criteria.

Table 1: Demographics

	N	Mean
Age	738	45.59
LOS	738	6.95
Diagnosis of Injury (Hospital day #)	738	.51
ISS	738	13.84
ETOH	424	50.17
GCS	691	13.89

Table 2: Day of Hand Injury Diagnosis

Day	Frequency	%	Cumulative %
0	578	78.3	78.3
1	96	13.0	91.3
2	29	3.9	95.3
3	9	1.2	96.5
4	6	.8	97.3
5	3	.4	97.7
6	4	.5	98.2
7	4	.5	98.8
9	1	.1	98.9
10	2	.3	99.2
11	1	.1	99.3
12	1	.1	99.5
13	3	.4	99.9
15	1	.1	100.0
Total	738	100.0	

Table 3: Group Comparisons

	Delayed Diagnosis	N	Mean	Std. Deviation	p value
Age	Yes	160	47.84	21.913	.160
	No	578	44.96	23.244	
GCS	Yes	156	12.95	4.027	<.001
	No	535	14.16	2.698	
ETOH	Yes	111	57.73	92.459	.300
	No	313	47.50	88.036	
ISS	Yes	160	17.57	10.864	<.001
	No	578	12.81	8.765	
LOS	Yes	160	10.41	11.024	<.001
	No	578	5.99	7.604	

Table 4: Logistic Regression Model ($p<0.001$)

Delayed Hand Injury Diagnosis	p value	Adjusted OR	95% Confidence Interval for Adjusted OR	
Intercept	.004			
GCS	.035	.934	.877	.995
Age	.001	1.020	1.008	1.032
Severely Injured	.015	2.014	1.144	3.549
Moderately Injured	.050	1.890	.999	3.575
Mildly Injured				
Alcohol Use	.058	1.605	.985	2.617
No Alcohol Use				
Female	.057	1.610	.985	2.629
Male				

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

			ISS Category			Total
			Mild	Moderate	Severe	
Delayed Diagnosis	Yes	N	50	33	77	160
		% within Delayed Diagnosis	31.3%	20.6%	48.1%	100.0%
		% within ISS Category	14.4%	24.1%	30.4%	21.7%
	No	N	298	104	176	578
		% within Delayed Diagnosis	51.6%	18.0%	30.4%	100.0%
		% within ISS Category	85.6%	75.9%	69.6%	78.3%
Total		N	348	137	253	738
		% within Delayed Diagnosis	47.2%	18.6%	34.3%	100.0%
		% within ISS Category	100.0%	100.0%	100.0%	100.0%

Discussion

- 78.3% 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 function outcomes or if patients required 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 this subset of patients, however, a short delay in the diagnosis of hand injuries may be unavoidable.