

Project : Deferred repair of blunt diaphragmatic injuries: the issues.

Background:

Blunt diaphragmatic rupture is associated with severe injuries (Meyers 1993, Boulanger 1993). Mortality rates in blunt diaphragmatic rupture may be as high as 42% (Shah 1995, Genfritz 1992). Associated injuries determine the prognosis (Bergeron 2002).

Diaphragmatic rupture is considered by several authors to be a surgical emergency requiring immediate repair (Asensio 2000). The risks of delayed or deferred repair of a blunt diaphragmatic rupture are not well documented. However, it is the associated injuries that require immediate treatment (Bergeron 2002).

In selected hemodynamically stable patients,

- 1) patients with severe head injury with a possibility of brain death or intent to stop active treatment because of bad prognosis related to brain injuries
- 2) significant pulmonary contusions needing stabilisation of the respiratory condition
- 3) patients with possible associated extra-abdominal injuries (head, aorta, pelvis, ortho) that need to be ruled out and that could be addressed at the same OR

we hypothesized that repair of diaphragmatic injuries could be deferred as long as patient remains stable, to permit these concerns to be evaluated and addressed (Bergeron 2002). In a retrospective study, many delays arrive because of various reasons.

The purpose of this study is to assess the impact of deferred treatment of blunt diaphragmatic rupture on patient survival. The results of this study may eventually serve for a prospective project.

Study population:

All patients 18 years of age and older with diaphragmatic injuries (ICD9CM: 862.0 & 862.1) secondary to blunt trauma admitted to a trauma center. The minimum required by center is 25 cases. The goal is to attain more than 500 cases, if possible more than 1000.

Exclusion:

- patients dead on arrival (less than 30 minutes)
- patients dead in the emergency room without an autopsy
- patients operated before transfer from referring center for diaphragm

Study period:

From 01 April 1999 to 31 March 2004

Data collection:

Individual review of all records of patients. Data transcribed into an Excel Database. Data sent to principal investigator for data gathering and analysis.

Data listing:

Record#: Record number of patient in case records have to be review later
 Gender: Female or Male
 Date_birth: Date of birth to calculate age
 Date_trauma: Date of traumatism
 Time_trauma: Time (hour and minute) of trauma from record (maybe approximated).
 Date_adm: Date of admission at trauma center
 Time_adm: Time (hour and minute) of admission to trauma center
 Tranfer: Transfer from other center, Yes or No
 Date_OR: Date of the OR for diaphragm repair
 Time_OR: Time (hour and minute) of the OR for diaphragm repair
 Mechanism: Mechanis of trauma
 Glasgow: Glasgow Coma Scale from 3 to 15
 RTS: Revised Trauma Score calculated with first ER vital signs

Score	Glasgow	Systolic	Respiratory
4	13-15	>=90	10-29
3	10-12	76-89	>29
2	7-9	50-75	6-9
1	4-6	1-49	1-5
0	3	0	0

$$(0.9368 * G) + (0.7326 * S) + (0.2908 * R)$$

AIS_head: Maximum Abbreviated Injury Scale of the HEAd region
 AIS_face: Maximum Abbreviated Injury Scale of the FACE region
 AIS_neck: Maximum Abbreviated Injury Scale of the NECK region
 AIS_thorax: Maximum Abbreviated Injury Scale of the THORAX region
 AIS_abdo: Maximum Abbreviated Injury Scale of the ABDO region
 AIS_spine: Maximum Abbreviated Injury Scale of the SPINE region
 AIS_upperlimb: Maximum Abbreviated Injury Scale of the UPPERLIMB & PELVIS region
 AIS_lower: Maximum Abbreviated Injury Scale of the LOWERLIMB region
 AIS_external: Maximum Abbreviated Injury Scale of the EXTERNAL region
 ISS: Injury Severity Score calculated from the Abbreviated Injury Scale 1990 revision
 Preop_dx: Diaphragmatic rupture known preop? Yes or No

Modality DX: The Dx test that confirm the diaphragmatic injury
CXR_result: Result of the preop Chest XR; if any positive preop, then positive
CT_result: Result of the preop thorax or abdo CT; if any positive preop, then positive
INDX_OR: The indication or reason to go to the OR
Hernia: Presence of diaphragmatic hernia (not just rupture) at OR: Yes or No
Side: Side of rupture: left, right or both
Date_discharge: Date of discharge
Outcome: Dead or alive
Death_cause: Cause of death
Injuries_Tx: Presence of all other injuries found at operation needing repair (ex: spleen injury grade 3 and over); list all.
Injuries_Others: Presence of all other injuries; list all.
Comments: Any comment that could be relevant for the study and analysis.

Analysis: Descriptive statistics. Comparison of groups of different delays (0-6 hr, 6-24 hr, 24+ hr). Multiple logistic regression for analysis of survival.

Results: Results will be submitted for presentation and publication in trauma related convention and journal.

Authorship: All participants in data collection, data analysis and manuscript preparation will be included in the list of authors irrespective of a maximum and of the relative contribution of each centers. The order of authors will be attributed according to the relative contribution to the present work.

Ethical concerns: The process of data collection must be adressed according local ethical rules. The data will have a record number to help to return in records in cases of specific question (EX: filling of blanks, review for unadequate data, specific questions, etc). The record number can be either the record of the patient or an attributed number from local investigator. The data will be sent with no name. Publication will respect the confidentiality of the centers and the individuals. No comparison between centers will be done.

Budget:

No budget will be allowed to submitting centers. No budget is submitted. All fees for central data review and analysis, communications and manuscript preparation and submission will be afforded by the principal investigator.

References:

Bergeron E, Clas D, Ratte S, Beauchamp G, Denis R, Evans D, Frechette P, Martin M. Impact of deferred treatment of blunt diaphragmatic rupture : A 15-year experience in six trauma centers in Quebec. J Trauma 2002;52 :633-640.

Boulanger BR, Milzman DP, Rosati C, Rodriguez A. A comparison of right and left blunt traumatic diaphragmatic rupture. *J Trauma* 1993 ;35 :255-260.
Genfritz FM, Stewart DE. Blunt trauma of the diaphragm : A 15-county private hospital experience. *Am Surg* 1992 ;58 :334-339.

Meyers BF, McCabe. Traumatic diaphragmatic hernia : Occult marker of serious injury. *Ann Surg* 1993 ;218 :783-790.

Shah R, Sabanathan S, Mearns AJ, Choudury AK. Traumatic rupture of the diaphragm. *Ann Thorac Surg* 1995 ;60 :1444-1449.