

Nødthorakotomi, håpløst eller livreddende ?

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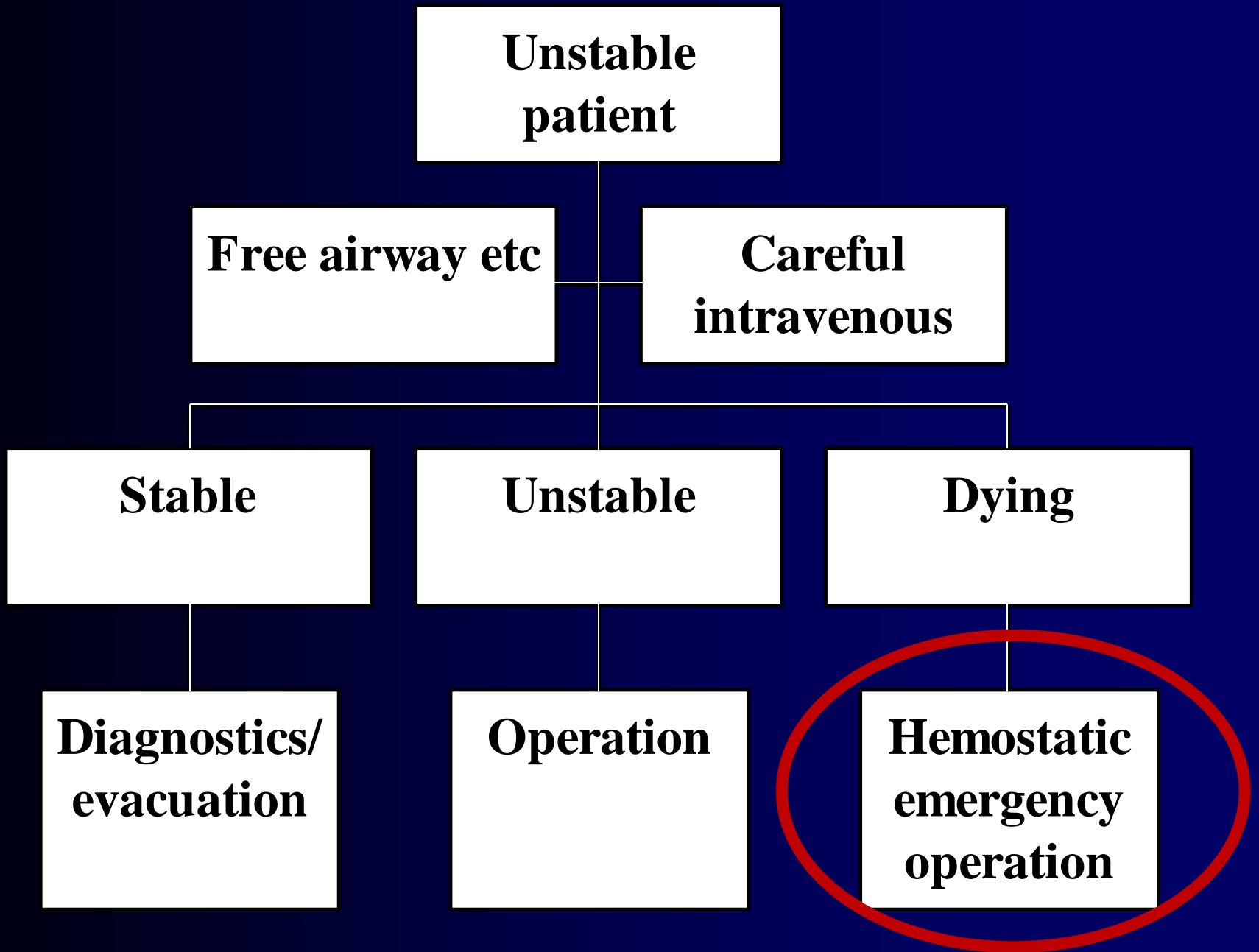
Oslo universitetssykehus Ullevål

Emergency room thoracotomy

Definition

- Opening of the chest in the admitting area
"Emergency department thoracotomy"
(EDT)
"Emergency room thoracotomy"
(ERT)

N Ø D T H O R A K O T O M I



Unstable patient

Free airway etc

Careful intravenous

Stable

Unstable

Dying

**Diagnostics/
evacuation**

Operation

**Hemostatic
emergency
operation**

Emergency room thoracotomy

Indications

- **Relieve cardiac tamponade**
- **Compression or clamping of the aorta**
- **Control of hemorrhage from the heart or the major vessels**

- **Control of massive air embolism**
- **Control of bronchopleural fistula**
- **(Cardiac massage)**

Emergency room thoracotomy

Survival

Collective series, 23 trauma centers

	Shock	No vital signs	No signs of life	Overall
Cardiac penetrating	57%	30%	13%	23%
Other penetrating	18%	6%	5%	9%
Blunt	2%	0,8%	0,7%	1%

Mattox, Moore, Feliciano. Trauma

Survival in penetrating chest trauma

100 patients in extremis

Ivatury RR & al.

Penetrating thoracic injuries: In-field stabilization vs prompt transport.

J Trauma 1987;27:1066-1073.

Survival in penetrating chest trauma

100 patients in extremis (Ivatury & al, 1987)

Group I: Stabilized in the field (n=51)

	cardiac	non cardiac
Stab	1/19	0/6
Gunshot	0/14	0/12

Group II: Direct transport (n=49)

	cardiac	non cardiac
Stab	7/20	0/4
Gunshot	1/16	1/9

Emergency thoracotomy, the first three years Ullevål University Hospital (1988 – 90)

Survivors

Penetrating (stab)	3/7	(43%)
Blunt	1/12	(8%)
All	4/19	(21%)

**Injury Severity Score (ISS), Trauma Score (RTS),
Probability of survival (TRISS), Base Deficit
were similar in survivors and nonsurvivors**

Emergency thoracotomy

Ullevål University Hospital (1991-1998, 7 years)

Survivors

Penetrating	8/19	(42%)
Stab	5/10 (50%)	
Gunshot	3/9 (33%)	
Blunt	8/53	(15%)
All	16/72	(22%)

Survivor's age mean 25 years

None above 40 years survived

Attempted in blunt injury and age 90, 81, 78, 76, 76, 75 years (!)

Emergency room thoracotomy

Contraindications

- **No vital signs and blunt injury**
(“no use”)

If not sure and patient young: Go!

- **Exsanguinated old patient that does not immediately respond to volume**
(“will never make it anyway”)

Emergency room thoracotomy

Indications

- **Lifeless patient with penetrating injury that has shown signs of life on site or during transport**
- **Exsanguinated patient that does not immediately respond to volume**
- **Obvious extensive abdominal bleeding with decreasing blood pressure and no response to volume – before laparotomy**

Emergency room thoracotomy (ERT)

Ullevål Hospital 2001 - 2007

- **109 consecutive patients**
- **Chest opened in ER**
(n o t hemostatic thoracotomies in the OR)

Ullevål University Hospital 2001 - 2007

- **Approx. 7000 multitraumatized patients admitted**
- **109 (1,4%) underwent ERT**

Blunt injury: 75%

Penetrating injury: 25%

Ullevål University Hospital, ERT 2001 - 2007

109 patients

Injury variables	Median	Quartiles
ISS	38	(26-50)
RTS	1,31	(0-3,92)
GCS score	3	(3-6)
Ps (TRISS)	0,06	(0,001-0,22)
SOL on site	79 %	
ERT < 30 minutes	24 %	

Emergency room thoracotomy

Ullevål University Hospital (2001-2007, 6 years)

Survivors

Penetrating	10/27	(37 %)
Blunt	10/82	(12 %)
All	20/109	(18 %)

Pahle A, Pedersen B, Skaga NO, Pillgram-Larsen J. J Trauma 2010.

TABLE 3. Patients Treated With Emergency Thoracotomy, Grouped by Outcome

Variable	Nonsurvivors (n = 89)	Survivors (n = 20)	<i>p</i> Value	Missing
Anterolateral ET	61 (69%)	13 (65%)	0.954	
Median sternotomy	8 (9%)	2 (10%)	0.954	
Combined*	20 (22%)	5 (25%)	0.954	
Age (yr)	29 (24–46)	34 (24–48)	0.672	1
Sex, males	60 (67%)	15 (75%)	0.601	
Penetrating injury	17 (63%)	10 (37%)	0.004	
Blunt injury	72 (88%)	10 (12%)		
RTS score	0.94 (0–3.57)	3.92 (2.63–6.03)	0.001	
ISS	42 (29–51)	26 (16–38)	0.001	
PS	0.06 (0.01–0.14)	0.54 (0.06–0.93)	0.001	
GCS score	3 (3–5)	7 (3–12)	0.001	
SOL at scene of accident	67 (75%)	19 (95%)	0.307	2
Arrival ED after injury (min)	40 (18–84)	45 (25–95)	0.477	7
ET <30 min after injury	21	5	0.994	26†
ET >30 min after injury	46	11		

All values are given as median (quartiles).

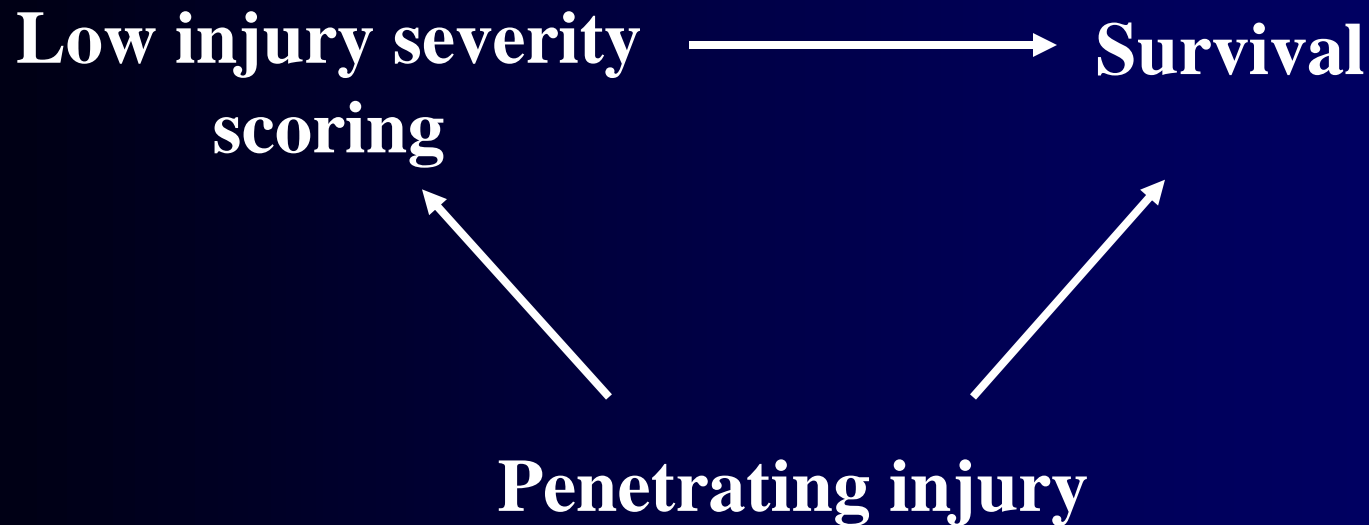
* Anterolateral and median sternotomy.

† Missing 6 in penetrating group and 20 in blunt group.

Logistic regression (univariable analysis)

Predictors for survival	Odds-ratio	95% CI
GCS score > 3	5,3	1,8-15,3
Penetrating injury	4,3	1,5-11,8

Penetrating injury is a confounder



Too healthy patients in Ullevål material?

Probably not

- The survivors were sick**
- Only one ERT was not indicated**

Is USA and Norway comparable?

- **Different trauma mechanisms?**
- **Different training?**

**Some of our "best" patients would
have been rushed to the OR in USA**

Emergency Room Thoracotomies (ERT) in Ullevål University Hospital 2001 – 2007.

Conclusions

- **Exact prognostics for ERT is impossible due to the urgency of the situation**
- **The threshold for doing ERT should be low in any hospital receiving trauma patients**
- **Particularly penetrating injuries have a relatively fair chance of survival**

Emergency room thoracotomy

Different materials

Study	Survivors	
Meta-analysis from USA¹⁾		7,8 %
Stavanger University Hospital (5 yrs) ²⁾	0/10	0 %
Ullevål University Hospital (7 yrs) ³⁾	20/109	18 %
Swiss material (12 yrs) ⁴⁾	10/49	20 %

1) J Am Coll Surg 2001;193:303.

2) Søreide K et al. Injury 2007;38:34.

3) Pahle AS et al. J Trauma 2010;68:599.

4) Lustenberger T et al. Br J Surg 2012;99:541.

Should ERT be done in a Scandinavian hospital?

Hospital	Survivors
Stavanger	0/10
Ullevål	20/109

Fisher's exact test, two tails: $p = 0,21$

Fischer's extact test, one tail: $p = 0,17$

Emergency room thoracotomy

Recommendation (minimum standard)

**All hospitals receiving acute trauma cases
should be prepared to open the chest in the
admitting area**

of a patient in extremis after penetrating injury

Nødthorakotomi

- Gjør det enkelt
- Handle intuitivt

.... eller la vær

Penetrerende hjertesaker

Ullevål 2001-10 (10år) N=31

	Antall	Overlevelse
Alle pasienter	31	14
Skuddskader	8	4
Stikkskader	23	10

Injury severity score 25 (21-35)

Revised Trauma Score 0 (0-7)

Glasgow Coma Score 3 (3-13)



**Gjør
det enkelt !**

PEOPLE MAKE A FUSS ABOUT
QUALIFICATIONS BUT WITH A BIT
OF COMMON SENSE ANYONE CAN
DO WHAT THESE MEDICAL TYPES DO!

