Non-operative management of solid organ injuries

DL Clarke

Introduction

- Trauma
- Huge Burden
- Selective Non Operative Management
- Imaging
- Technology
- Blunt
- Penetrating

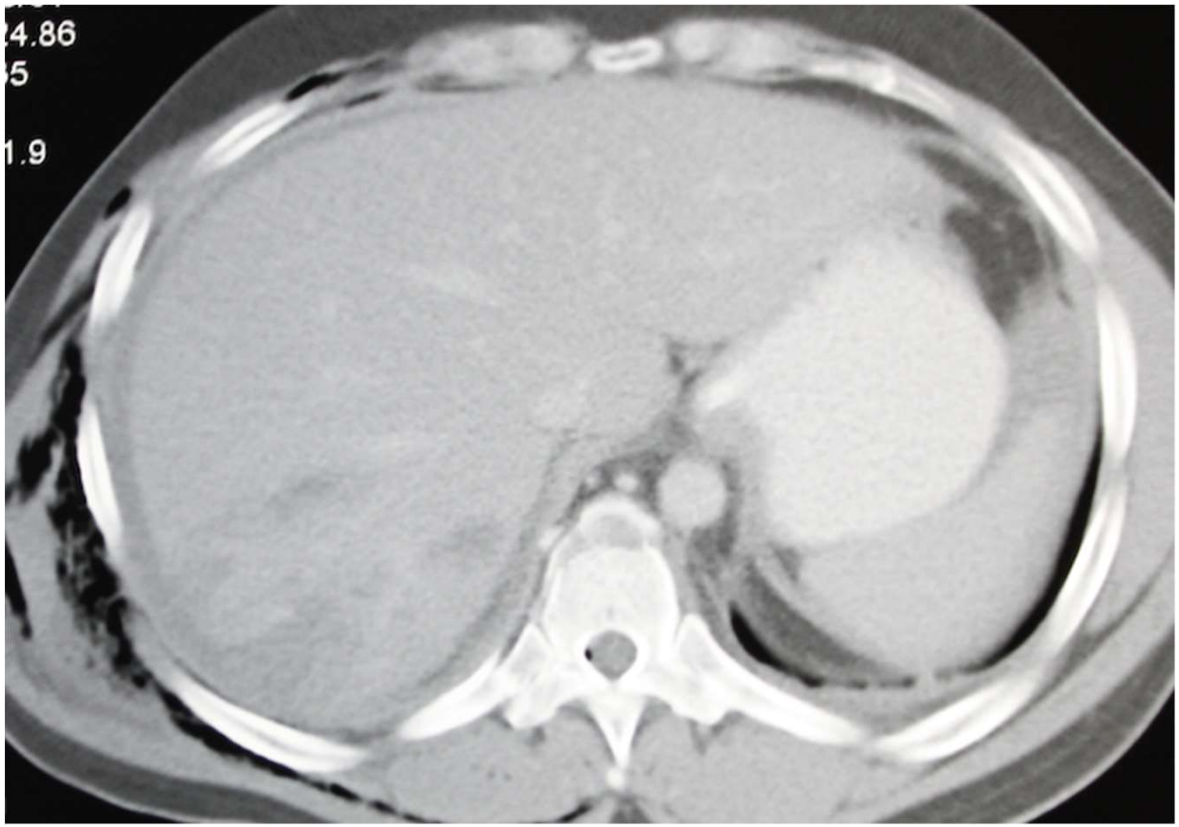
Solid Viscera

- Liver
- Spleen
- Kidney

Principles

- Resuscitate
- Unstable
- FAST
- Operation
- Stable
- Mechanism
- Seat belt sign
- Image
- CT scan

Hepatic Trauma



Hepatic Trauma in PMB 2012-2019

Table 1. Demographics and trauma scores	
Total	824
Median age (IQR)	29 (22.0-36.0)
Male:Female	646 : 140
Mortality	68 (8.25%)
ICU	290 (35.4%)
Mean shock index (SD)	0.806 (0.67-1.0)
Mean RTS (SD)	12 (11-12)
Median ISS (IQR)	18 (10-25)

Table 5. AAST classification

AAST classification	Number of patients (% *)	ICU (% +)
1	121 (18.3%)	34 (28.1%)
2	283 (42.8%)	89 (31.5%)
3	162 (24.5%)	70 (43.2%)
4	77 (11.6%)	36 (46.8%
5	18 (2.7%)	15 (83.3%)
Total	661	

- AAST categorie 1-5 vs IC: logistic regression p=significant

* % of total patients

+ % of patients per AAST classification

Blunt vs penetrating

Table 6. Demographics of penetrating vs blunt liver injuries			
	Penetrating	**Blunt**	**p-value**
Total	367	441	
Mean age (SD)	30.24 (SD 10.336)	29.99 (SD 15.356)	0.789
Male : Female	326 : 35	316 : 105	<0.0001
Mortality	28 (7.4%)	40 (9.1%)	0.463
ICU	114 (31.4%)	169 (38.4%)	0.029
Mean shock index (SD)	0.845 (0.359)	0.891 (SD 0.306)	<0.001
Mean RTS (SD)	11.75 (xx)	11.19 (xx)	<0.0001
AAST classification			
1	59 (21.7%)	64 (14.5%)	0.075
2	124 (45.6%)	164 (37.2%)	0.356
3	71 (26.1%)	93 (21.1%)	0.434
4	26 (9.6%)	52 (11.8%)	0.041
5	3 (1.1%)	15 (3.4%)	0.021

Blunt vs Penetrating Liver Trauma

Surgery			
Surgery n (%)	308 (83.9%)	143 (33.8%))	<0.0001
Surgical interventions			
Pack	42 (13.3%)	45 (31.5%)	0.571
Suture	35 (11.4%)	15 (10.5%)	<0.0001
Drain	69 (22.4)	32 (22.4%)	<0.0001
Bogota	19 (6.2%)	11 (7.7%)	0.045
Resect	3 (1%)	2 (1.4%)	0.664
Complications			
n (%)	214 (58.3%)	240 (54.5%)	0.267
Statistics:			

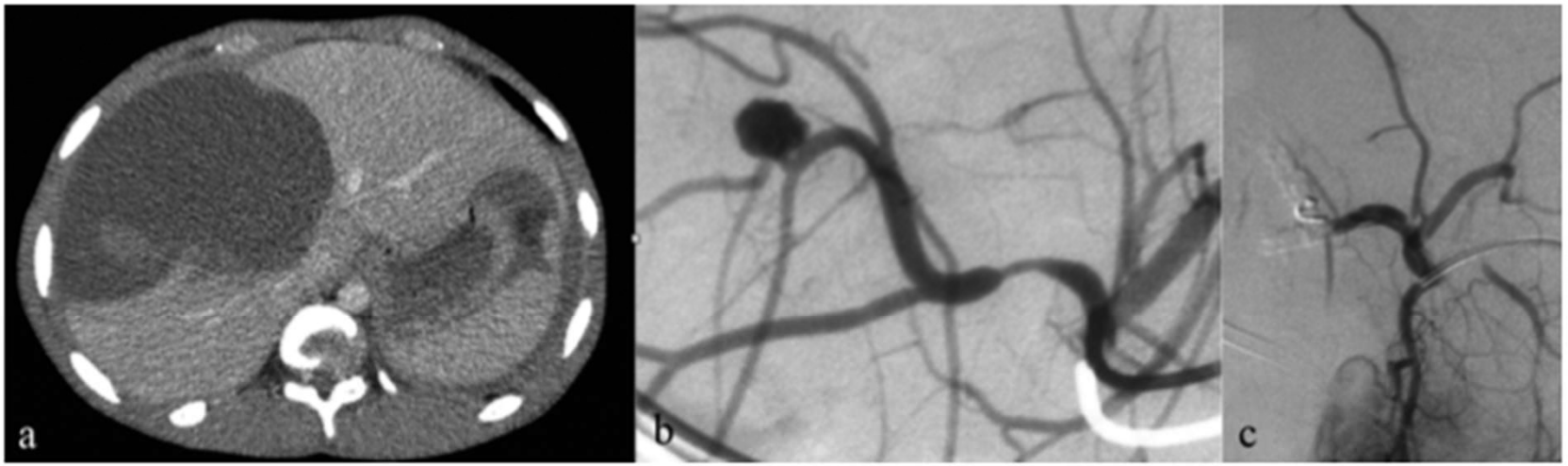


Fig .1. (a) Contrasted CT scan showing features suggestive of a large sub-capsular biloma (18 Hounsfield units); (b) pseudo-aneurysm of segmental branch of the right hepatic artery; (c) post-coil angio-embolisation of hepatic artery pseudo-aneurysm.

SAJS

Case Report

Haemobilia following blunt liver injury

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Splenic Trauma

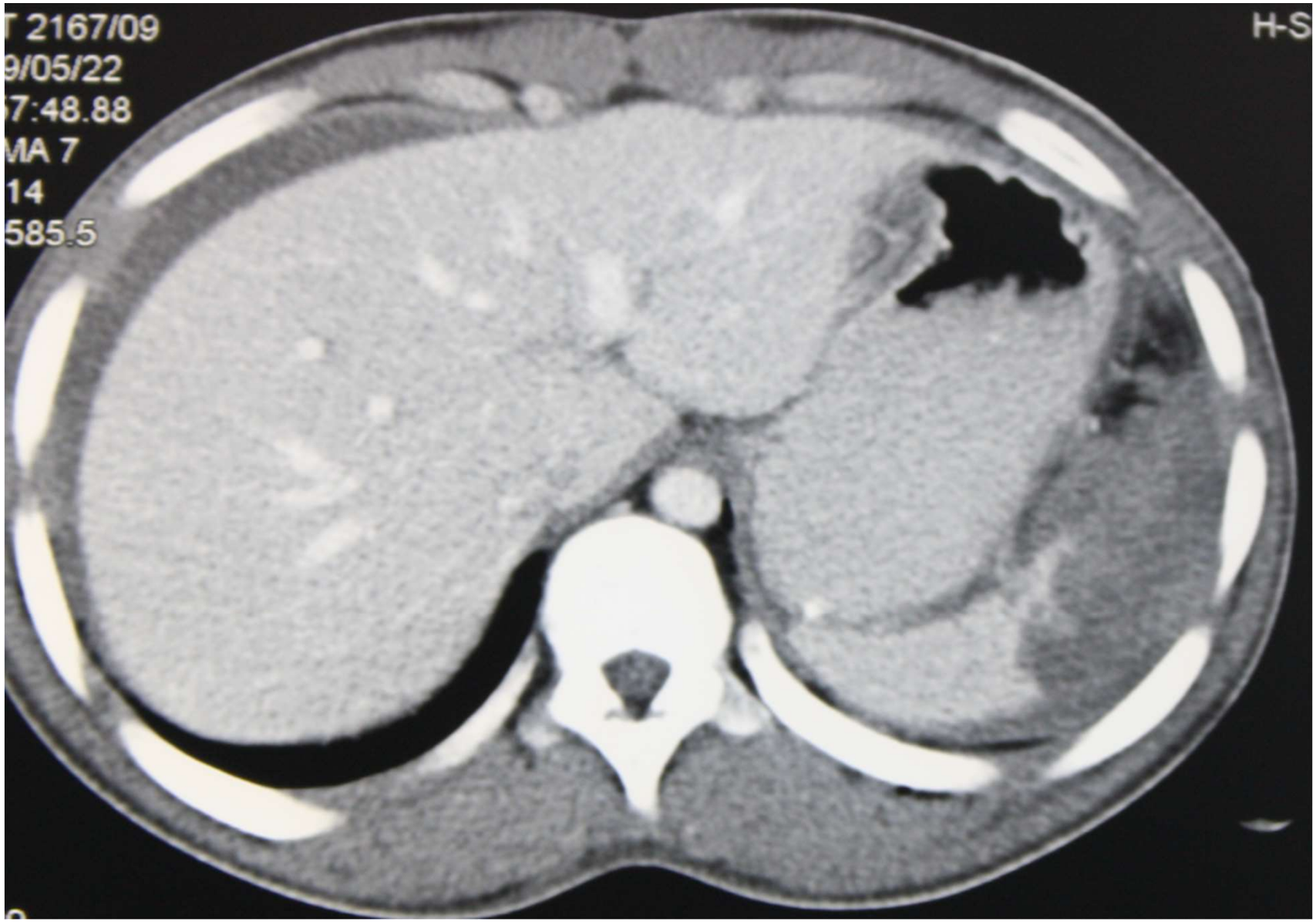
- 127 patients.
- Median age was 29 [19-35]
- 42 women and 85 men.
- Blunt injuries (81, 64%).
- Organ injury scale (OIS) included grades I (25, 20%), II (43, 34%), III (36, 28%), IV (15, 11%) and V (8, 6%).

Outcomes

- Nine deaths.
- Increasing OIS was associated with operative management,
- Intensive care (ICU) admission,
- Hospital and ICU duration of stay,
- Not patient mortality,
- Delay to care (>24 hours) was associated with increased ICU utilization (62% vs 36%, p=0.008) and mortality (14% vs 4%, p=0.03).

Implications

- After adjusting for age, sex, ISS, presence of shock, and splenic OIS,
- Penetrating mechanism (adjusted odds ratio, 5.7; 95%CI, 1.7-9.8)
- Admission lactate concentration (adjusted odds ratio, 1.4; 95%CI, 1.1-1.9)
- Significantly associated with OP compared to NOM (p=0.002; area under the curve 0.81).


T 2167/09
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7:48.88
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Splenic Trauma in PMB

	AAST Organ Injury Grade for Spleen					
Variable	AAST I N=25	AAST II N=43	AAST III N=36	AAST IV N=15	AAST V N=8	P
Mortality	1, 4	3, 7	2, 6	3, 20	0,0	.4
Length of Stay	2 [1-3]	3 [2-6]	4 [2-7]	5 [4-8]	10 [4-13]	.03
ICU Length of Stay	1 [0-2]	2 [1-11]	4 [3-8]	4 [2-7]	8 [5-15]	.01
ICU Admission	8, 36	14, 39	11, 32	9, 60	3, 38	.04
Laparotomy	10, 40	23, 53	20, 56	10, 66	6, 75	.002
ISS	13 [10-21]	16 [9-21]	16 [9-22]	18 [13-24]	22 [16-34]	.03
Hemoglobin concentration	11.5 [9.9-13.5]	11.1 [8.3-12.7]	10.9 [7-13.2]	10.5 [8.1-11.7]	9.3 [7.1-10.7]	.01
Penetrating trauma?	6, 24	21, 48	14, 38	3, 20	2, 25	.3
Lactate concentration	1.6 [0.9-2.1]	1.9 [1.2-3.2]	3 [1.7-4.2]	3.2 [1.9-4.3]	3.8 [2.3-5.1]	.001

CASE REPORT

Selective angioembolisation for splenic salvage following blunt abdominal trauma

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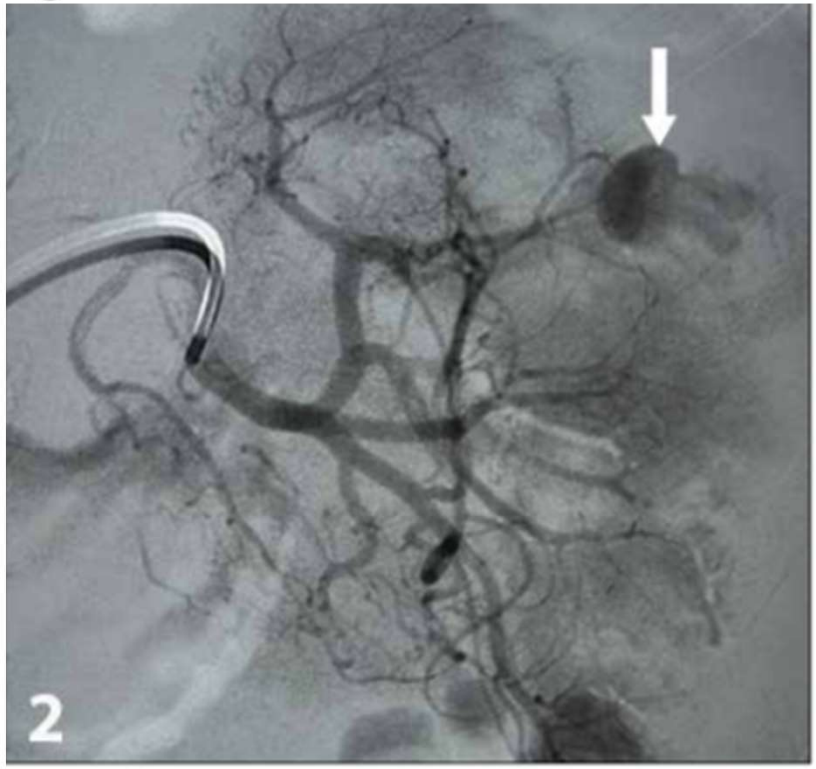

Fig. 2. Formal angiogram demonstrating active contrast extravasation from the/a segmental artery.

Renal Trauma in PMB 2012-2017

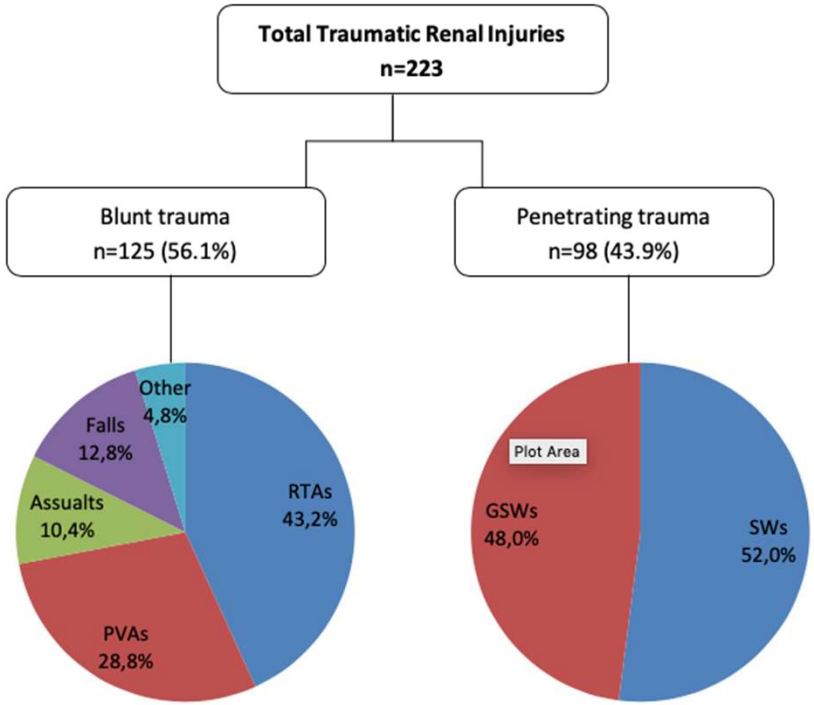

Figure 2: Summary of the mechanism and causes of TRIs.

Grade of Injury versus mechanism

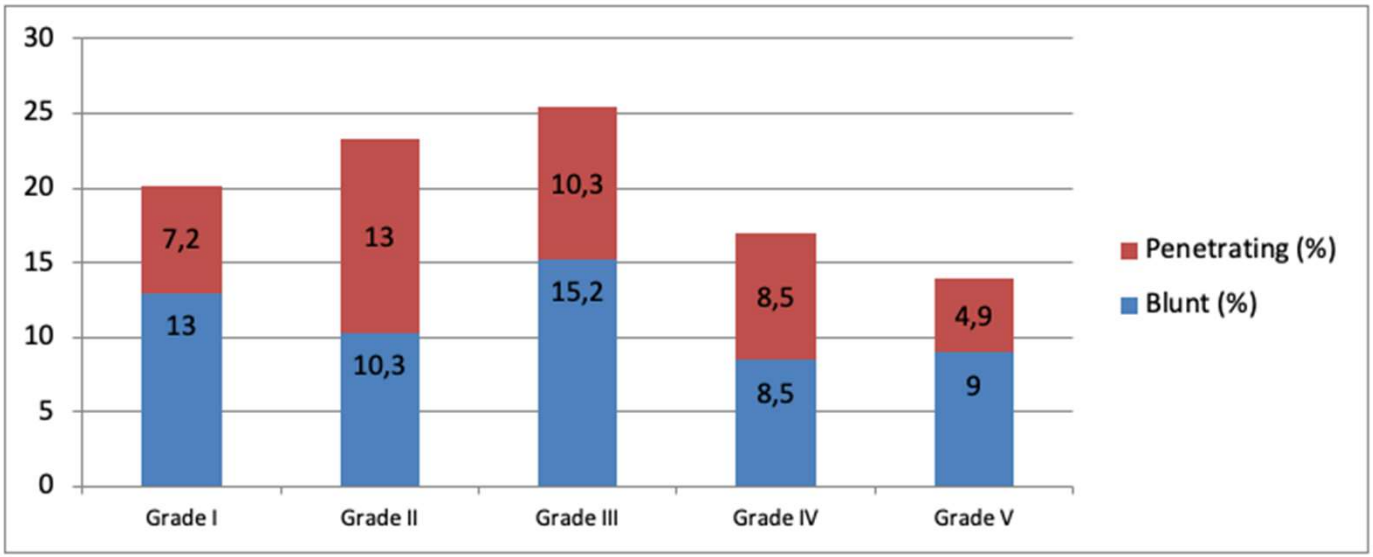

Figure 3: Distribution of TRI by mechanism and AAST grade.

Table 2: Management of TRI classified by AAST kidney injury scale, showing percentage management within each grade.

	AAST I	AAST II	AAST III	AAST IV	AAST V	Total
Non-operative	26 (59.1%)	20 (38.5%)	32 (56.1%)	23 (60.5%)	17 (54.8%)	118 (53.2%)
Surgical exploration and repair of kidney	1 (2.3%)	4 (7.7%)	3 (5.3%)	0 (0%)	0 (0%)	8 (3.6%)
Nephrectomy	1 (2.3%)	0 (0%)	7 (12.3%)	9 (23.7%)	10 (32.3%)	27 (12.2%)
Insertion of JJ stent	0 (0%)	1 (1.9%)	2 (3.5%)	1 (2.6%)	0 (0%)	4 (1.8%)
Embolisation of kidney	0 (0%)	0 (0%)	0 (0%)	2 (5.3%)	0 (0%)	2 (0.9%)
Abdominal operation but no renal exploration	15 (34.1%)	26 (50%)	12 (21.1%)	3 (7.9%)	4 (12.9%)	60 (27%)
Total	44 (100%)	52 (100%)	57 (100%)	38 (100%)	31 (100%)	222 (100%)

Risk Factors for nephrectomy

Table 3: Results of univariate logistic regression to identify risk factors for nephrectomy

Parameter	**OR (95% CI)**	**p-Value**
Age in years	1.01 (0.97 – 1.04)	0.718
High grade (AAST III-V) injury	15.43 (3.58 – 66.55)	**<0.001**
Penetrating mechanism	4.53 (1.92 – 10.73)	**0.001**
Accompanying injuries	0.433 (0.17 – 1.11)	0.081
SBP <90 mmHg on presentation	4.04 (1.13 – 14.39)	**0.031**
HR on presentation	1.01 (0.98 – 1.02)	0.106
Hb < 10 g/dL on presentation	2.44 (1.07 – 5.57)	**0.033**
Base deficit < -6	2.54 (1.09 – 5.93)	**0.030**
Lactate > 4 mmol/L	0.83 (0.3 – 2.31)	0.726

Bold indicates a significant finding

SBP = systolic blood pressure, HR = heart rate, Hb = haemoglobin

CASE REPORT

A case of selective non-operative management of penetrating abdominal trauma in a 3rd-trimester pregnancy

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This case report describes the successful selective non-operative management of a pregnant woman who sustained an abdominal gunshot wound.

S Afr J Surg 2015:53(3):xx-xx. DOI:10.7196/SAJS.7745

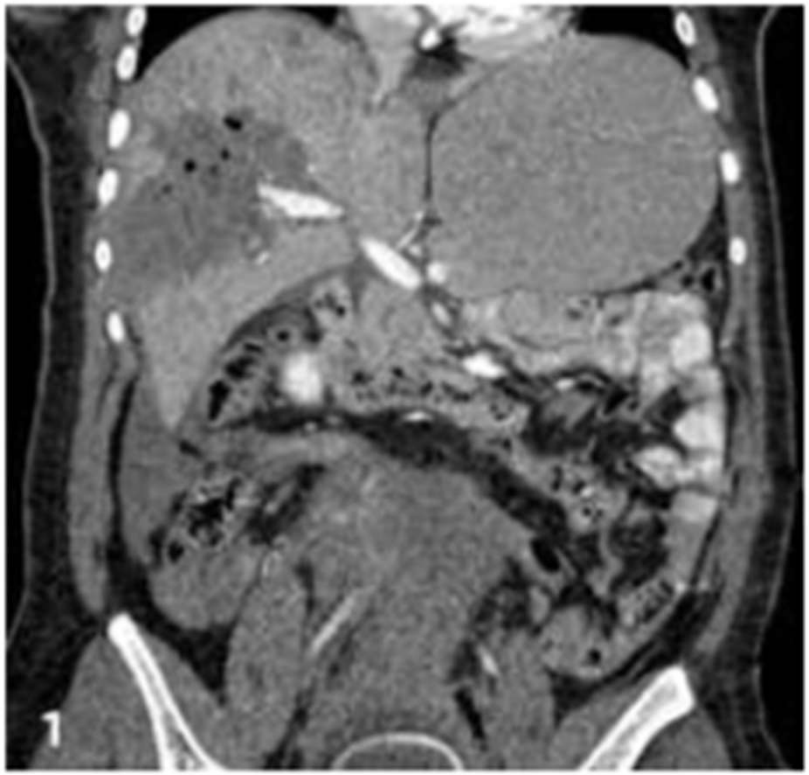

Fig. 1. Coronal CT image of AAST grade 4 hepatic injury.

Fig. 2. Sagittal CT image of AAST grade 4 hepatic injury and grade 3 renal injury. The fetal corpse is visible within the uterus.

Conclusion

- Increasing role
- Selection
- Imaging
- Endoscopic
- Endovascular

Good results