

Trauma hépatiques complexes

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HSC – UdM
25 mars 2010

Objectifs

- Expérience HSC
- Présentation de cas
- Trauma hépatiques
- Trauma hépatiques sévères
- Prise en charge non-chirurgicale
- Complications tardives
- Prise en charge chirurgicale
- Voies d'avenir

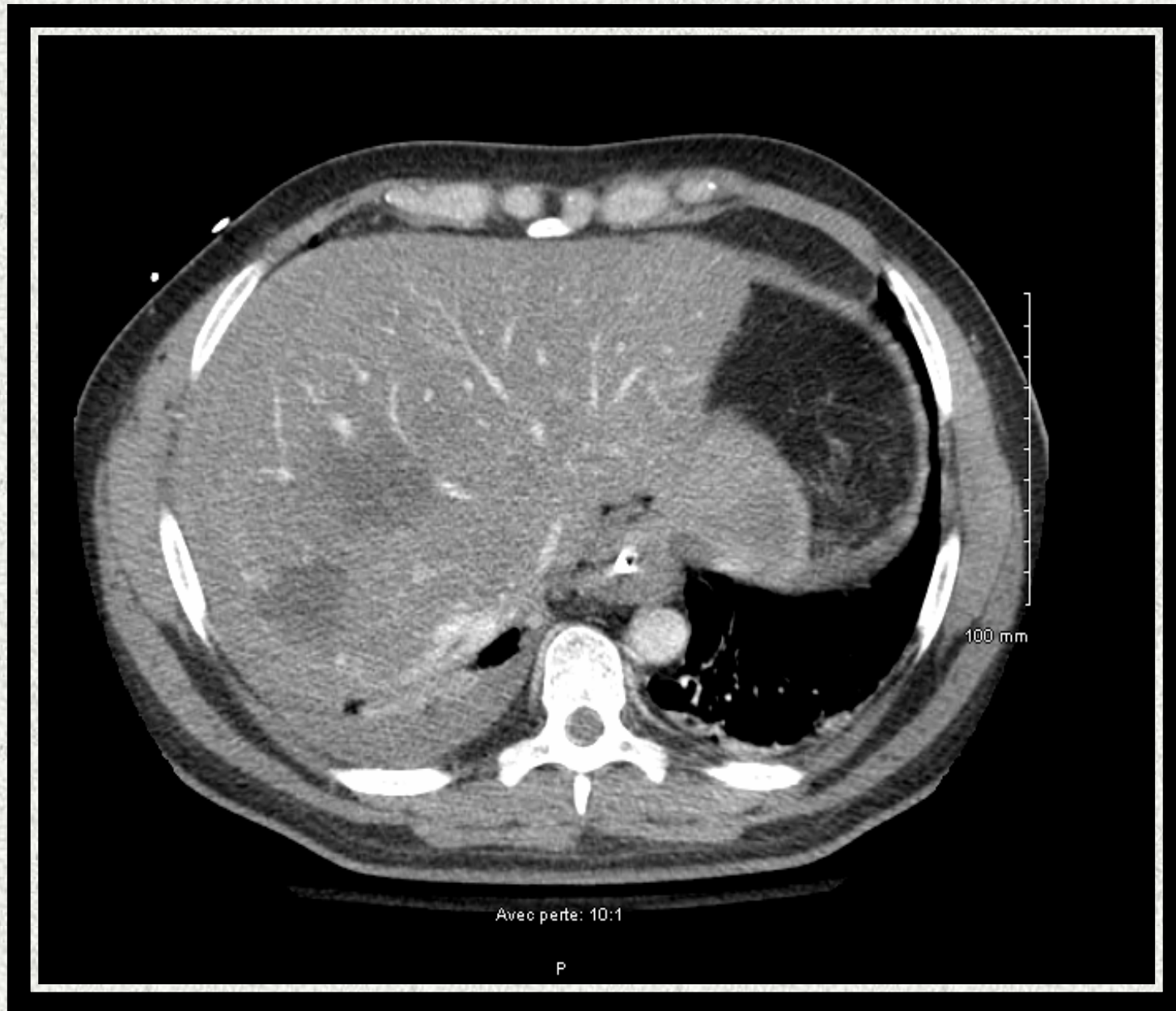
Expérience à HSC

- 450 trauma hépatique 1995-2009
- 6% embolisé
- 15% SOP
- 10% décès
- 6 chirurgiens traumatologues

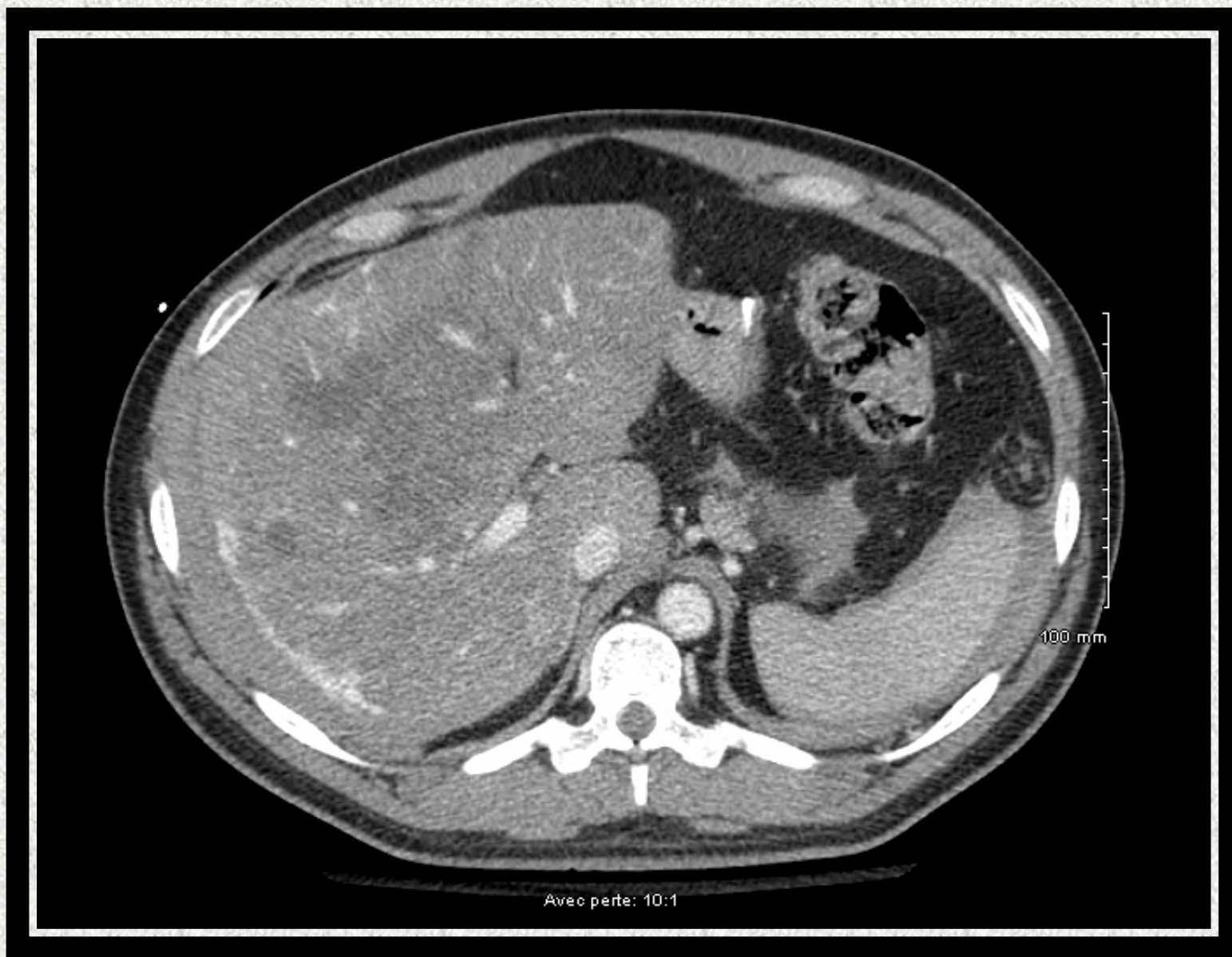
Présentation de cas

- H 42 sans ATCD
- Chute à cheval
- 'Crush injury' par le cheval
- Transfer à HSC
 - GCS 15
 - FC 128
 - TA 90/50
 - FR 28, SaO₂ 100%
 - R-X pms et bassin N
 - FAST +

Jour 1









Avec perte: 10:1

Jour 1 à 7

- Angio-embolisation sélective seg. VI – VII
- Stable HD avec 2L cristalloïde
- Transfusion 2 culots en 5j
- USI
- NPO
- Bas séquentiels
- Drainage pleural

Jour 8

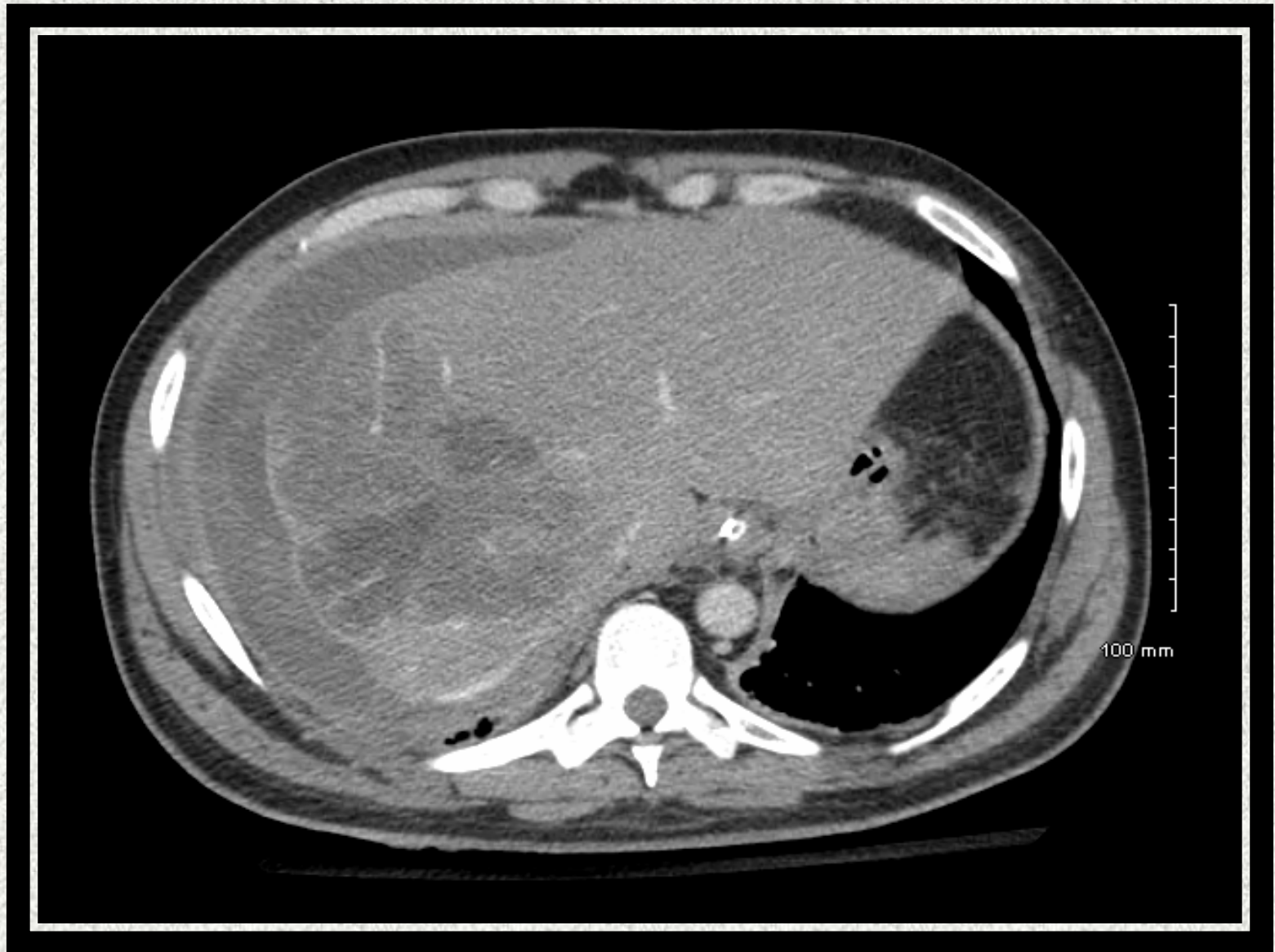
- Hypotension, tachycardie, diaphorèse
- Chute d'Hb
- CT abdo

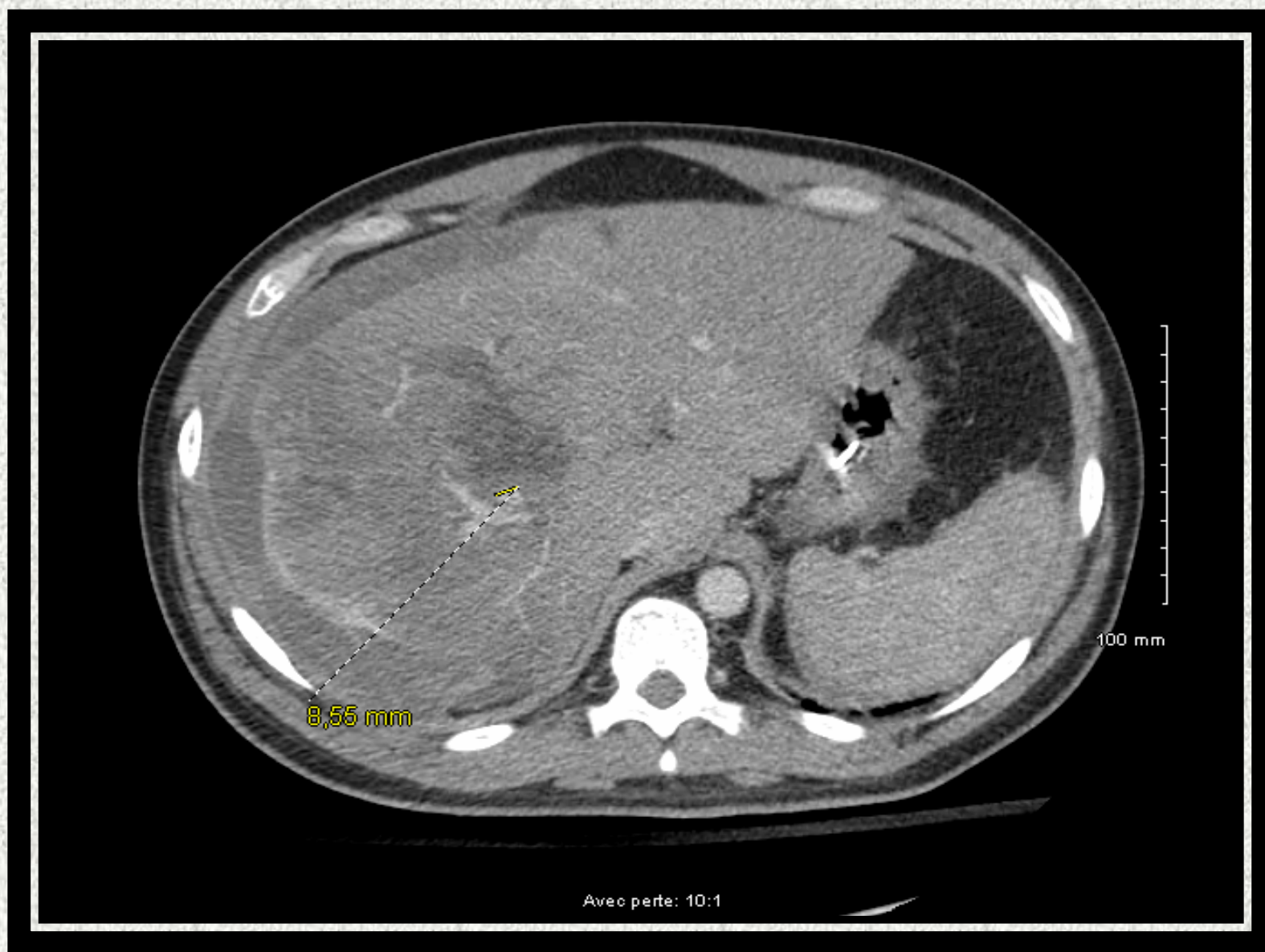
Hb

10/07/15	23:18	98	□□□□□□□□□□□□□□
10/07/15	20:34	126	□□□□□□□□□□□□□□□□
10/07/15	17:26	102	□□□□□□□□□□□□□□
10/07/15	03:19	87	□□□□□□□□□□□□□□
10/07/14	21:00	88	□□□□□□□□□□□□□□
10/07/14	12:07	88	□□□□□□□□□□□□□□
10/07/14	04:38	82	□□□□□□□□□□□□□□
10/07/13	20:43	88	□□□□□□□□□□□□□□
10/07/13	13:38	88	□□□□□□□□□□□□□□
10/07/13	04:49	84	□□□□□□□□□□□□□□
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10/07/11	15:55	73	□□□□□□□□□□

Date & time prelevée	Test:hb	Unités:g/L
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10/07/08 18:19	89	□□□□□□□□□□□□□□
10/07/08 03:14	86	□□□□□□□□□□□□□□
10/07/07 13:49	93	□□□□□□□□□□□□□□
10/07/07 04:56	84	□□□□□□□□□□□□□□
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10/07/05 13:00	85	□□□□□□□□□□□□□□
10/07/05 05:43	82	□□□□□□□□□□□□□□
10/07/04 22:36	82	□□□□□□□□□□□□□□
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10/07/04 02:21	93	□□□□□□□□□□□□□□
10/07/03 21:04	114	□□□□□□□□□□□□□□□□

Jour 8







100 mm

Jour 8

- CT abdo:
 - Re-saignement
 - Faux-anévrysme artère hépatique D segment VII
 - Fistule artério-porte intra-segmentaire
 - Thrombose veine porte G
 - Nécrose centrale
- Transfusion 2 culots et stabilisation
- Angio-embolisation artère hépatique D

Jour 11

- Cholestase
- HIDA scan: séquestre hépatique

Date & Hre prélevée	Test:Bilirubine directe	Unités:umol/L
10/07/28 08:37	55	
10/07/27 19:50	76	
10/07/27 07:49	84	
10/07/23 07:53	89	
10/07/22 09:13	81	
10/07/16 19:00	133	
10/07/15 03:19	75	
10/07/13 05:02	140	
10/07/12 13:56	232	
10/07/11 18:03	145	
10/07/11 07:00	92	
10/07/10 08:43	99	
10/07/08 03:22	73	
10/07/07 04:56	47	
10/07/06 04:27	24	

Traumas hépatiques

Table 1
Liver organ injury scale

Grade		Description
I	Hematoma	Subcapsular, <10% surface area
	Laceration	Capsular tear, <1 cm parenchymal depth
II	Hematoma	Subcapsular, 10%–50% surface area; intraparenchymal, <10 cm in diameter
	Laceration	1–3 cm parenchymal depth, <10 cm in length
III	Hematoma	Subcapsular, >50% surface area or expanding; ruptured subcapsular or parenchymal hematoma
	Laceration	>3 cm parenchymal depth
IV	Hematoma	Parenchymal disruption involving 25%–75% of hepatic lobe or 1–3 Couinaud segments within a single lobe
V	Laceration	Parenchymal disruption involving >75% of hepatic lobe or >3 Couinaud segments within a single lobe
	Vascular	Juxtahepatic venous injuries; ie, retrohepatic vena cava/central major hepatic vein
VI		Hepatic avulsion

Data from Moore EE, Shackford SR, Pachter HL. Organ injury scaling: spleen, liver and kidney. J Trauma 1995;38:323–4.

Traumas hépatiques

- Prise en charge non-chx 95%
- Prise en charge non-chx haut grades 80%
- 2/3 laparotomies pour lésions associées
- Prédicteurs de complications et mortalité
 - Grade
 - #culots
 - Lésions associées
- Mortalité
 - Sg
 - TCC
 - Sepsis/MOF

Traumas hépatiques

Table 3 Associated injuries and corresponding Abbreviated Injury Score in 183 patients with liver injury

Injured organ	No. of patients	Mean(s.d.) AIS
Head	102 (55.7)	2.6(0.6)
Chest	148 (80.9)	3.3(0.8)
Abdominal (other than liver)	94 (51.4)	2.5(0.8)
Bone and joint (spinal, pelvic and limb)	121 (66.1)	2.5(0.9)

Values in parentheses are percentages unless indicated otherwise. AIS, Abbreviated Injury Score.

Table 4 Extrahepatic abdominal injuries in patients with liver injury

	No. of patients
Splenic injury	50
Renal injury	45
Hollow viscus injury (avulsion of the mesentery, contusion, perforation)	15
Diaphragmatic rupture	10
Pancreatic injury	9
Vascular injury	8
Other	3
Total	140

Schnüriger, B. et al. BJS 2009

Traumas hépatiques

Table 1 Overview of mortality and morbidity rates of patients with liver injury

	No. of patients	Mortality		Morbidity	
		Liver-related	Other	Liver-related	Other
High-grade injury (n = 81)					
Non-operative management	63	2 (3)	0 (0)	7 (11)	11 (17)
Emergency laparotomy	18	7 (39)	0 (0)	7 (39)	5 (28)
Low-grade injury (n = 102)					
Non-operative management	85	0 (0)	17 (20)	0 (0)	7 (8)
Emergency laparotomy	17	0 (0)	5 (29)	1 (6)	6 (35)
Total (n = 183)					
Non-operative management	148	2 (1.4)	17 (11.5)	7 (4.7)	18 (12.2)
Emergency laparotomy	35	7 (20)	5 (14)	8 (23)	11 (31)

Values in parentheses are percentages.

Schnüriger, B. et al. BJS 2009

Traumas hépatiques

Table 6 Overview of all causes of death and Injury Severity Scores

Cause of death	No. of patients	Mean(s.d.) ISS
Exsanguination by collateral damage	10	35.9(7.1)
Abdominal vascular lesion	5	
Splenic and renal lesion	2	
Pulmonary laceration	2	
Cardiac rupture	1	
Liver-related death	9*	41.3(6.8)
Exsanguination	8	
Sepsis/MOF	1	
Delayed complication	12	40.0(10.1)
Severe cerebral oedema	7	
Fatal pulmonary embolism	4	
Sepsis/MOF	1	

*All patients had grade 3–5 liver injury. ISS, Injury Severity Score; MOF, multiorgan failure.

Prise en charge non-opératoire

ORIGINAL ARTICLE

The Journal of **TRAUMA**® Injury, Infection, and Critical Care • Volume 67, Number 6, December 2009

Western Trauma Association Critical Decisions in Trauma: Nonoperative Management of Adult Blunt Hepatic Trauma

Rosemary A. Kozar, MD, PhD, Frederick A. Moore, MD, Ernest E. Moore, MD, Michael West, MD, Christine S. Cocanour, MD, James Davis, MD, Walter L. Biffl, MD, and Robert C. McIntyre, Jr., MD

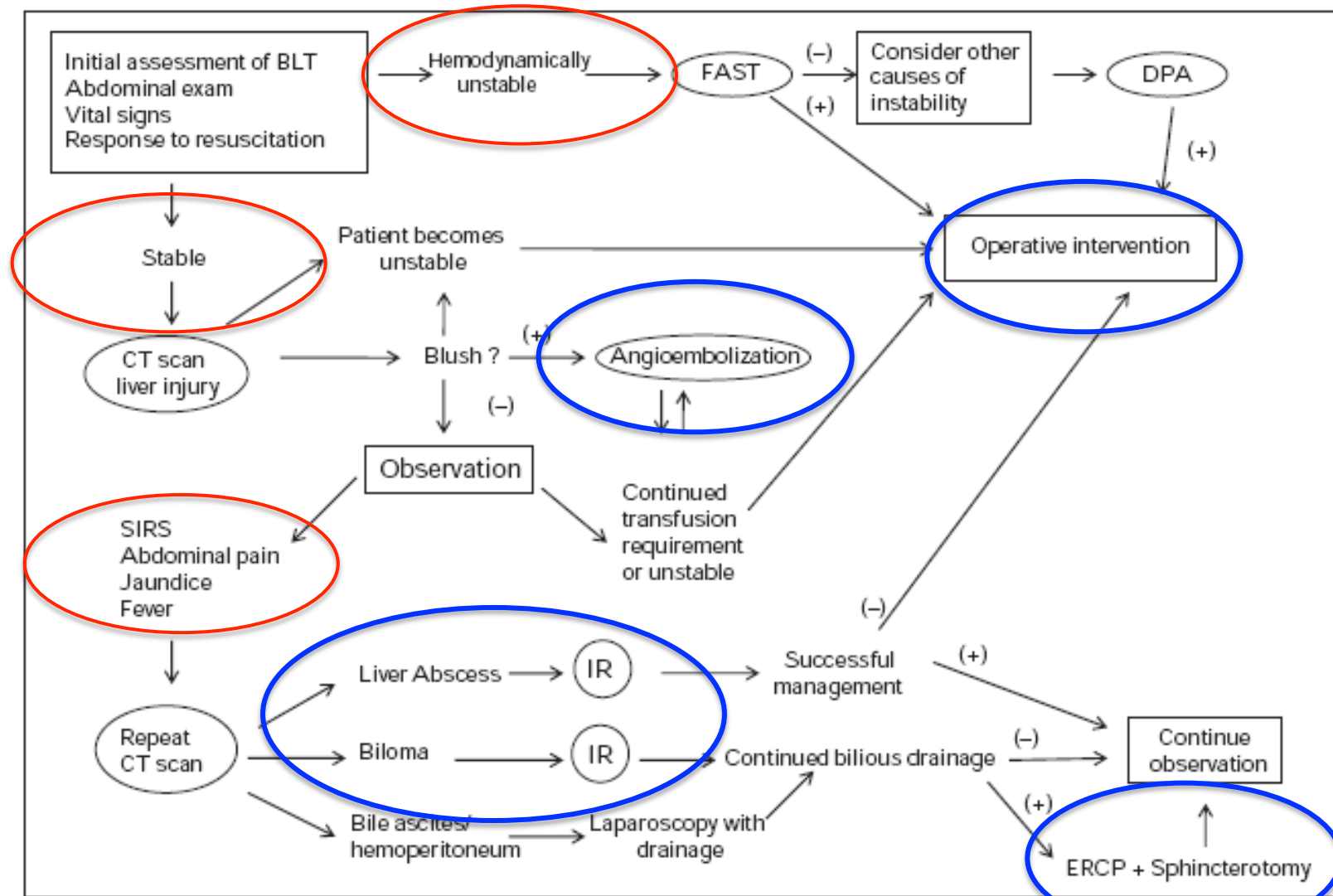
J Trauma. 2010 Mar;68(3):721-33.

Practice management guidelines for selective nonoperative management of penetrating abdominal trauma.

Como JJ, Bokhari F, Chiu WC, Duane TM, Holevar MR, Tandoh MA, Ivatury RR, Scalea TM.

Division of Trauma, Critical Care, and Burns, Department of Surgery, MetroHealth Medical Center, Cleveland, Ohio, USA.
jcomo@metrohealth.org

Figure 1 Algorithm for nonoperative management of blunt liver trauma



BLT, blunt liver trauma; CT, computed tomography; DPA, diagnostic peritoneal aspiration; ERCP, endoscopic retrograde cholangiographic embolization; FAST, focused abdominal sonography for trauma; IR, interventional radiology; SIRS, systemic inflammatory response syndrome.

TABLE 1. Nonoperative Management Success

Liver Injury Grade	Attempted NOM (n)	ISS*	NOM Success (%)	Inpatient Failure	Outpatient Failure
I and II	459	17 ± 10	96	19	0
III	99	22 ± 11 [†]	89	11	0
IV	30	25 ± 10 [†]	87	3	1
V	3	34 ± 22 [†]	67	1	0
All grades	591		94	34	1

ISS, injury severity score.

* ISS is listed as the average for the group ± SD.

[†] Statistically significant increase with $p < 0.001$.

Richardson, JD. Ann Surg 2000

Christmas, AB. Surg 2005

Heuer, M et al. J Gastrointestin Liver Dis 2009

Parks, JA. J Trauma 2011

Como, JJ et al. J Trauma 2010

Résultats

- SOP 15-20%
- Échec au tx non-opératoire 2-7%
- Diminution de laparotomie blanche
 - » 12% complications
- Diminution de la mortalité précoce
 - » 19% à 9% total
 - » 90 à 45% par atteinte veineuse sévère

Richardson, JD. Ann Surg 2000

Christmas, AB. Surg 2005

Heuer, M et al. J Gastrointestin Liver Dis 2009

Parks, JA. J Trauma 2011

Como, JJ et al. J Trauma 2010

Angio-embolisation

- Saignement actif ou à haut-risque
 - » 'Blush' en péritoine libre
 - » 'Blush' intra-parenchymateux
 - » Faux-anévrysmes
 - » Fistules A-V
- Addition à la chirurgie
 - » 52% de sg actif post-packing
 - » Ajout à la ressuscitation agressive post-packing
- Diminue transfusions

Kozar, KA et al. Arch Surg 2006
Kozar, KA. Curr Op Crit Care 2010

Prise en charge opératoire

- Pt instable
 - 25% coagulopathie de choc
 - Éviter triade léthale
- 'Damage control'
 - Arrêt du saignement et contamination
 - Fermeture temporaire
 - Transfert aus USI pour correction physiologique
 - Retour en SOP pour chx définitive



Abb. 4 ▲ Koagulation oberflächlicher bzw. flächenhafter Blutungsquellen mittels Argon-Beamer nach subkapsulärem Hämatom mit Kapselruptur



Abb. 5 ▲ Blutungen aus oberflächlichen Einrisse ohne Eröffnung großer Gefäße können mittels mono- oder bipolarer Elektrokoagulation zum Stillstand gebracht werden

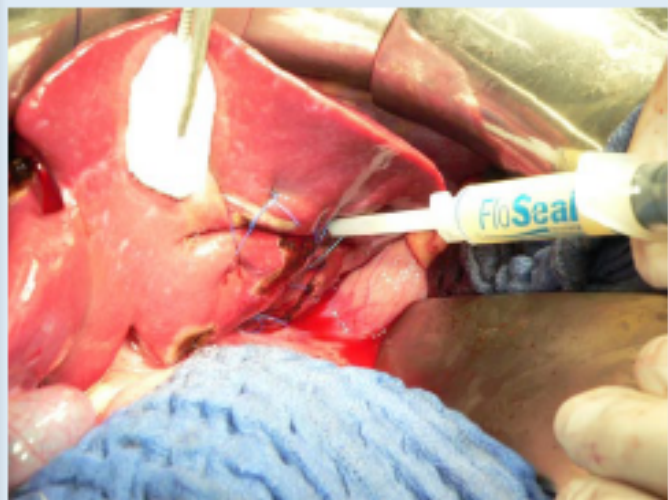


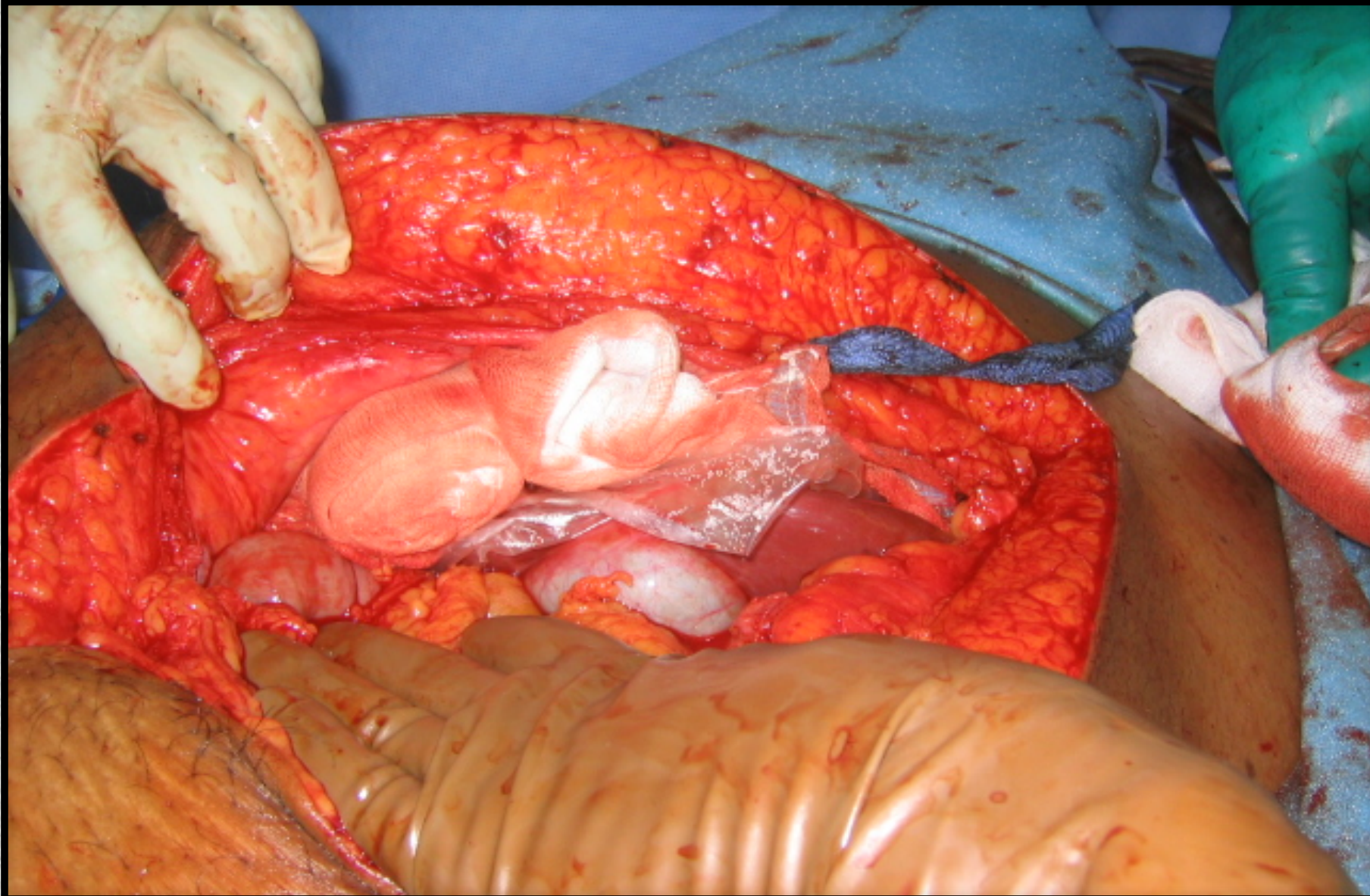
Abb. 6 ▲ Stillung flächenhafter Sickerblutungen mittels unter sanfterm Druck applizierter fibrinogen- und thrombinbeschichteter Collagemembrane



Abb. 7 ▲ Parenchymeinrisse werden mittels Leberrahmt versorgt. Der Einsatz von Gelatine-Thrombin-Matrix (FloSeal®) an schwer zugänglichen Bereichen bietet sich auch bei arteriellen Spritzblutungen an, um für ein schnelles Stoppen der Blutung zu sorgen

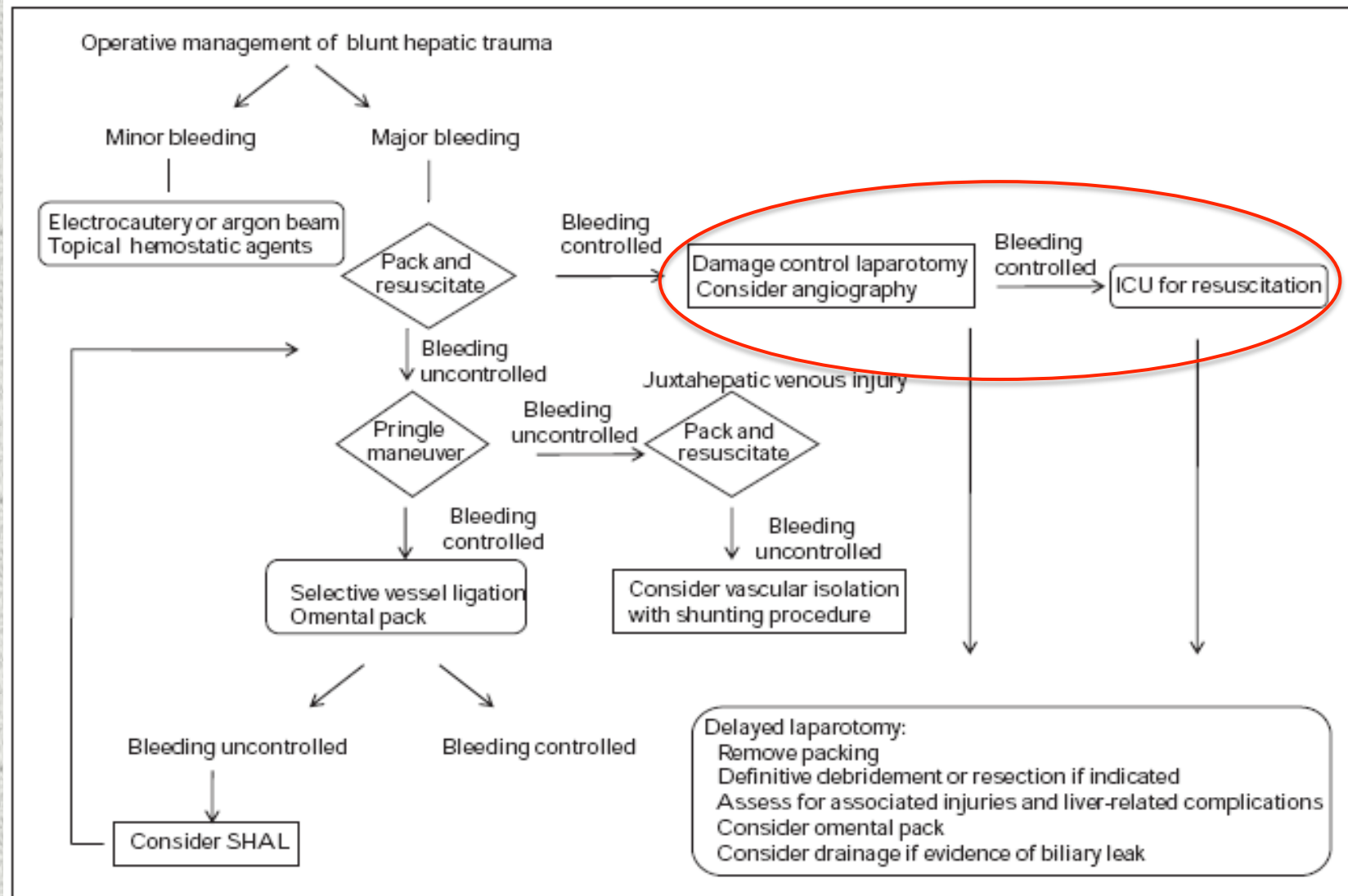
for resuscitation

complications



Kozar, KA. J Trauma 2006

Figure 2 Algorithm for operative management of blunt liver trauma



SHAL, selective hepatic artery ligation.

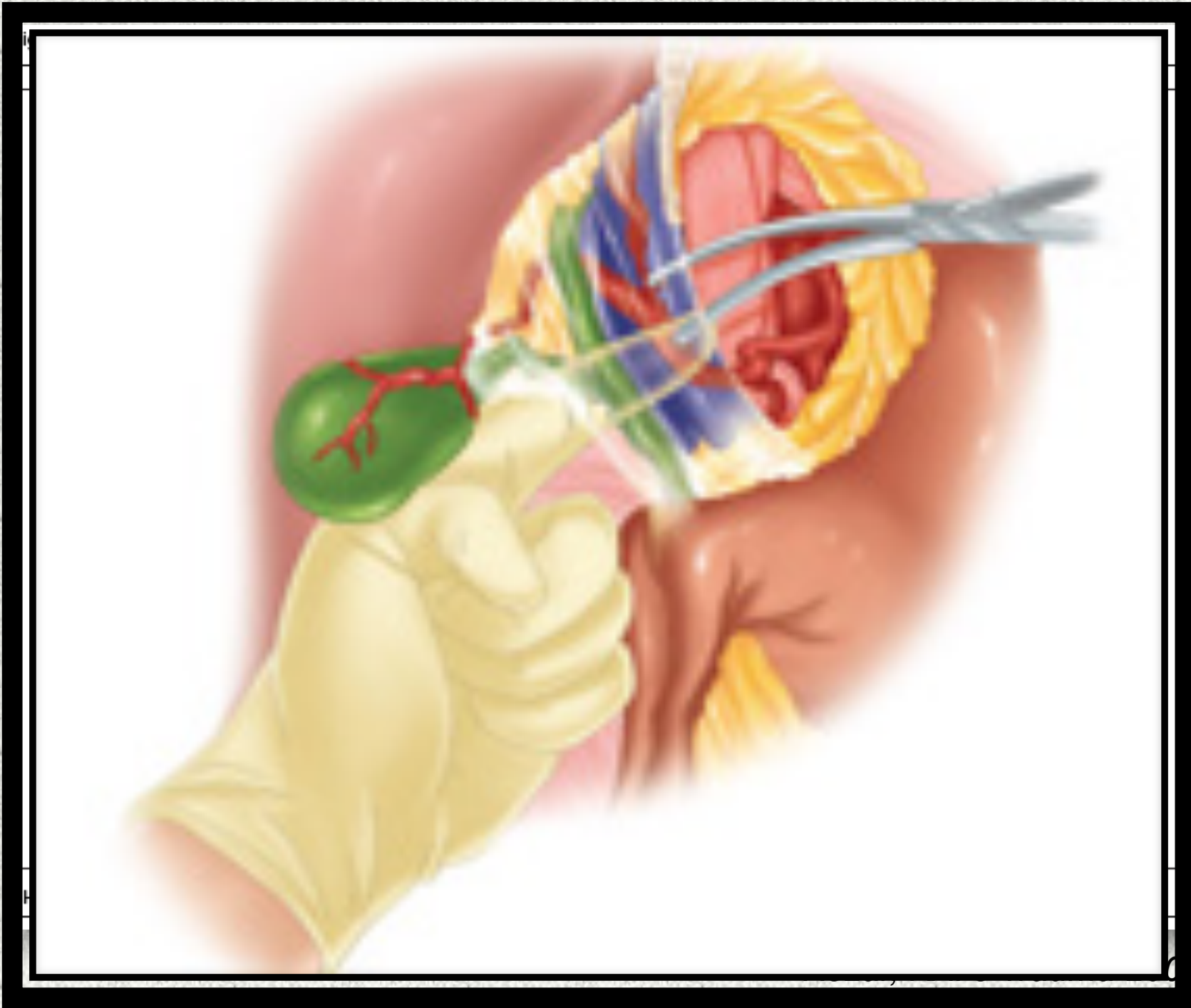
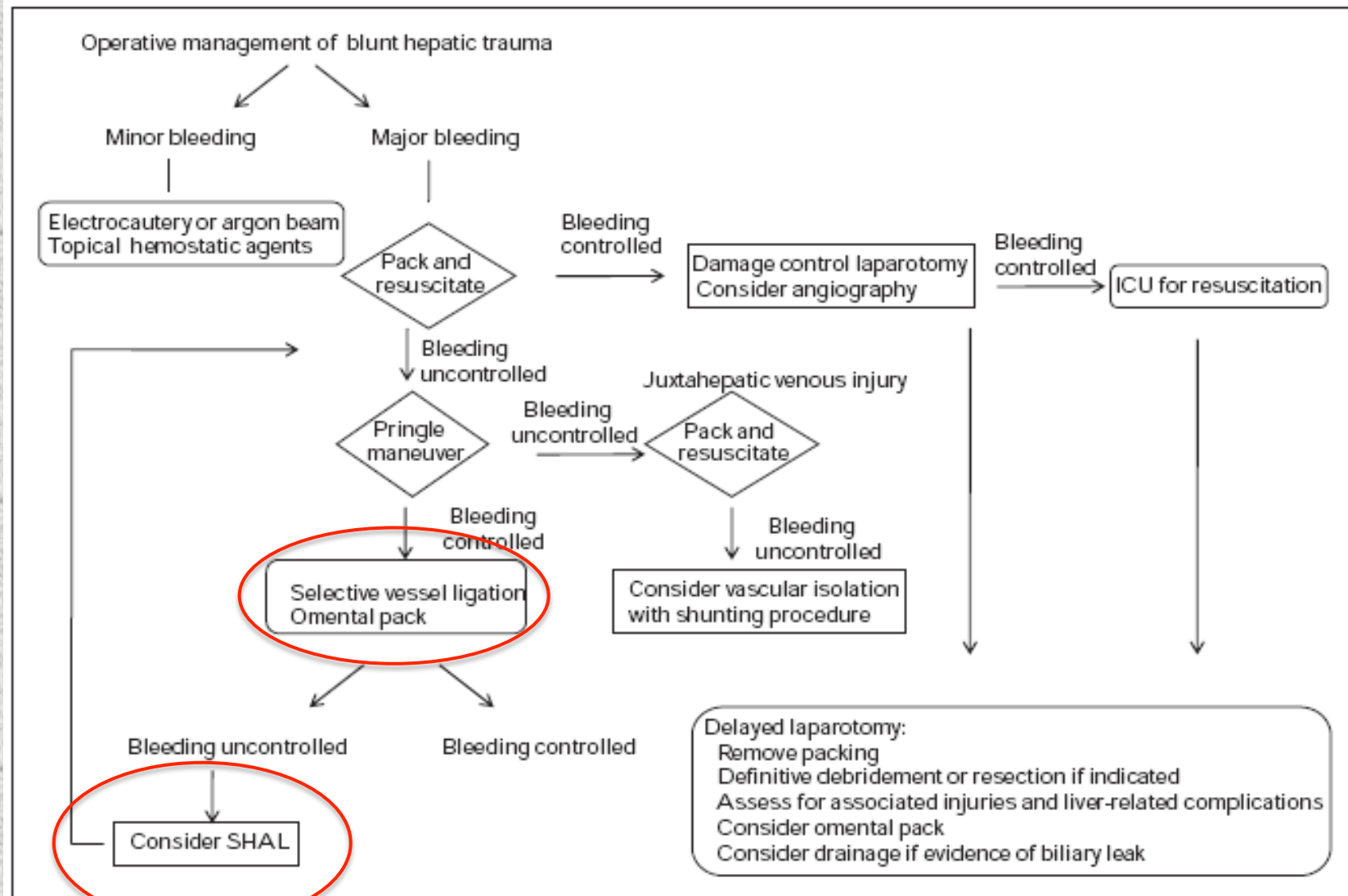


Figure 2 Algorithm for operative management of blunt liver trauma



SHAL, selective hepatic artery ligation.

'Damage control'

- Résection anatomique 2-5%
- Packing péri-hépatique initial
 - » Bénéfice de survie 20-30%
 - » Diminue transfusions (3.5 L)
 - » Effet de tamponnade saignement médical
 - » Effet tamponnade 80% saignement chirurgical
- Permet stabilisation

Cogbill, TH et al. J Trauma 1988
Asensio, JA. J Trauma 2003
Piper, GL. Surg Clin N Am, 2010

Complications tardives

- Saignement
- Fuite biliaire / Biliome
- Nécrose vésiculaire
- Nécrose hépatique
- Compartiment
- Sepsis
- MOF
- Décès 8%

Table 3. Hepatic Complications by Liver Grade

Complication	No. of Complications		
	Grade 3	Grade 4	Grade 5
Bleeding episodes	6	18	14
Early (<24 h) only	5	9	4
Late ($\geq$ 24 h)	1	8	8
Rebleed (early and late)	0	1	2
Biliary complications	6	22	1
Bile peritonitis	3	4	0
Bile leak	2	6	1
Biloma	0	11	0
Biliary-venous fistula	0	1	0
Bile duct injury	1	0	0
Infections	3	11	1
Abdominal sepsis	0	6	0
Abscess	2	5	0
Necrosis	1	0	1
Abdominal compartment syndrome	2	1	2

Kozar, RA. Arch Surg 2006

Table 2. Biliary Complications and Management Strategies

Complication	Treatment					PID (Range)
	E-lap	Laparoscopy	ERCP/Stent	IR Drainage	Observation	
Bile peritonitis	3	4	0	0	0	2-19
Bile leak	0	0	9	0	0	4-19
Biloma	0	0	0	9	2	5-38
BV fistula	1	0	0	0	0	7

Abbreviations: BV, biliary venous; E-lap, exploratory laparotomy; ERCP, endoscopic retrograde cholangiopancreatography; IR, interventional radiology; PID, postinjury day.

Kozar, RA. Arch Surg 2006

Major Hepatic Necrosis: A Common Complication After Angioembolization for Treatment of High-Grade Liver Injuries

Danielle N. Dabbs, DO, Deborah M. Stein, MD, MPH, and Thomas M. Scalea, MD

- Nécrose présente 30-60% selon grade
- Combinaison embolisation + packing
- Morbidité
- Traitement?
 - » Observation
 - » Débridement
 - » Résection anatomique

Table 4 Liver-Related Complications After AE

Complication	n (%)
Major hepatic necrosis	30 (42.2)
Bile leak	14 (19.7)
Abscess	12 (16.9)
Gallbladder necrosis	5 (7.0)
Rebleeding	2 (2.8)
Pseudoaneurysm formation	1 (1.4)
Cholecystitis	1 (1.4)
Biliary stricture	1 (1.4)
Liver injury-related death	8 (11.3)
Total complications	74
Overall complication rate	60.6%

Table 5 Comparison of Patients Who Developed Necrosis Versus Those Who Did Not

	MHN n = 30	No Necrosis n = 41	p
Age (years)	31.3 ± 12.9	36.6 ± 15.6	0.1
Male	23 (76.7%)	27 (65.8%)	0.3
Admitting GCS	12.4 ± 4.1	11.5 ± 4.7	0.4
Admitting SBP (mm Hg)	120.3 ± 32.9	119.5 ± 41.0	0.9
Admitting DBP (mm Hg)	73.4 ± 25.5	70.5 ± 26.6	0.6
Admitting HR	108.2 ± 24.3	100 ± 27.7	0.2
ISS	36.9 ± 9.6	36.9 ± 13.8	0.9
TRISS	0.77 ± 0.27	0.79 ± 0.30	0.6
RTS	6.6 ± 1.8	6.9 ± 1.4	0.4
Liver Injury (AAST-OIS)			
Grade III	2 (6.7%)	14 (34.1%)	0.006
Grade IV	20 (66.7%)	24 (58.5%)	
Grade V	8 (26.7%)	3 (7.5%)	
Mean	4.2 ± 0.5	3.7 ± 0.6	0.001
MOI			
Blunt	20 (66.7%)	36 (87.8%)	0.03
Penetrating	9 (30.0%)	4 (9.8%)	0.03
Crush	1 (3.3%)	1 (2.4%)	0.8
RBCs transfused (units)	29.4 ± 21.8	7.5 ± 9.2	<0.0001
Plasma transfused (units)	29.3 ± 25.9	7.5 ± 11.1	<0.0001
LOS (days)	34.3 ± 20.7	15.8 ± 15.3	<0.0001
ICU-LOS (days)	23.2 ± 20.3	11.6 ± 15.0	0.008
Other liver-related complications	18 (60.0%)	14 (34.1%)	0.03
Total deaths	2 (6.7%)	8 (19.5%)	0.1
Liver-related deaths	2 (6.7%)	6 (14.6%)	0.3

GCS, Glasgow Coma Score; SBP, systolic blood pressure; DBP, diastolic blood pressure; HR, heart rate; MOI, mechanism of injury; RBCs, red blood cells; ICU, intensive care unit.

Dabbs, DN. J Trauma 2009

Major Hepatic Necrosis: A Common Complication After Angioembolization for Treatment of High-Grade Liver Injuries

Danielle N. Dabbs, DO, Deborah M. Stein, MD, MPH, and Thomas M. Scalea, MD

- Nécrose présente 30-60% selon grade
- Combinaison embolisation + packing
- Morbidité
- Traitement?
 - » Observation
 - » Débridement
 - » Résection anatomique

Hepatic Resection in the Management of Complex Injury to the Liver

Patricio Polanco, MD, Stuart Leon, MD, Jaime Pineda, MD, Juan C. Puyana, MD, Juan B. Ochoa, MD, Lou Alarcon, MD, Brian G. Harbrecht, MD, David Geller, MD, and Andrew B. Peitzman, MD

- n = 56 (de 1049 pts)
- Contrôle du saignement
- Résection anatomique semi-élective
- Mortalité totale 17% / Propre 9%
- Morbidité totale 60% / Propre 30%

Treatment of Major Hepatic Necrosis: Lobectomy Versus Serial Debridement

Danielle N. Dabbs, DO, Deborah M. Stein, MD, MPH, Benjamin Philosophe, MD, PhD,
and Thomas M. Scalea, MD

- $n = 30$
- Même survie
- Lobectomies plus transfusés
- Lobectomies précoce (5j) moins morbide et plus courte durée de séjour

Transplantation et trauma

LIVER TRANSPLANTATION 14:1204-1210, 2008

ORIGINAL ARTICLE

Emergency Liver Transplantation Following Severe Liver Trauma

Olga N. Tucker, Paul Marriott, Mohamed Rela, and Nigel Heaton

Institute of Liver Studies, King's College London School of Medicine, King's College Hospital, London, United Kingdom

- Hépatectomies totales
- Exsanguination par trauma veineux
- Nécrose extensive
- Stabilisation aux SI
- Greffe

Approche combinée

Scandinavian Journal of Surgery 96: 214–220, 2007

MULTIDISCIPLINARY APPROACH FOR THE MANAGEMENT OF COMPLEX HEPATIC INJURIES AAST-OIS GRADES IV–V: A PROSPECTIVE STUDY

J. A. Asensio, P. Petrone, L. García-Núñez, B. Kimbrell, E. Kuncir

Division of Trauma and Surgical Critical Care, Department of Surgery,
University of Southern California Keck School of Medicine, LAC + USC Medical Center
Los Angeles, California

- n = 75 hauts-grades
- Damage control et ré-intervention précoce
- Embolisé avant ré-opération meilleure survie
- Mortalité 24%

Collaboration multidisciplinaire

The Journal of **TRAUMA**® Injury, Infection, and Critical Care • Volume 68, Number 1, January 2010

Reaudit of Specialist-Managed Liver Trauma

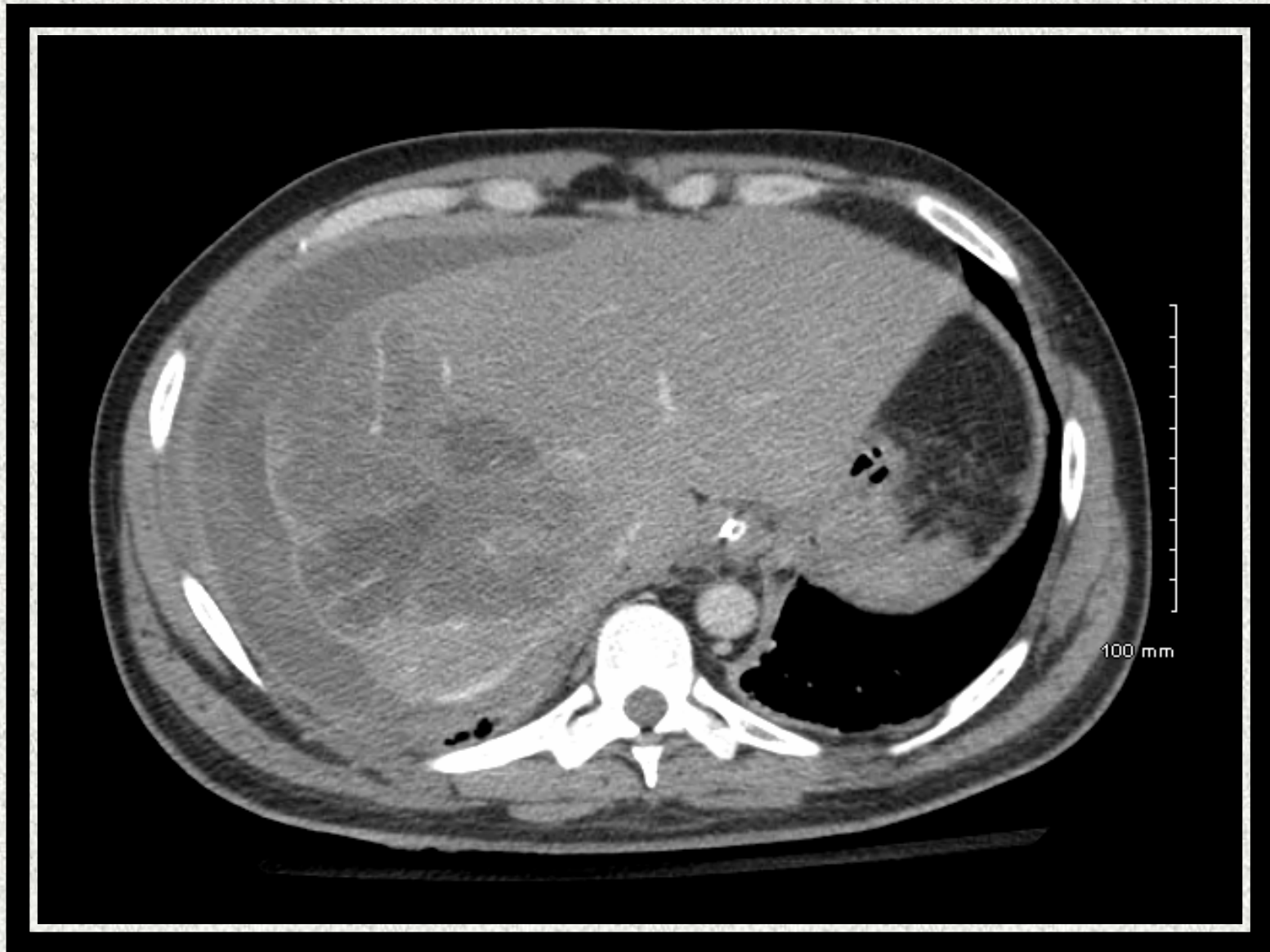
ORIGINAL ARTICLE

A Reaudit of Specialist-Managed Liver Trauma After Establishment of Regional Referral and Management Guidelines

Krishnamoorthy Ramkumar, MS, FRCSEd(Gen), M. Thamara P. R. Perera, MS, FEBS,
Ravi Marudanayagam, MS, FRCS, Chris Coldham, BSc, Simon P. Olliff, FRCR, David A. Mayer, FRCS,
Simon R. Bramhall, MD, FRCS, John A. C. Buckels, MD, FRCS, and Darius F. Mirza, MS, FRCS

- Régionalisation et guidelines
- n = 99
- 25% de consultations péri-op CHBP
- Moins de SOP, meilleure survie

Retour sur le cas



Jour 12 à 24

- Hépatectomie droite
 - Chirurgien HBP volant
 - Écho per-op
 - Finger fracture
 - Transfusions massives
 - Drain
- USI
- Fuite biliaire post-op

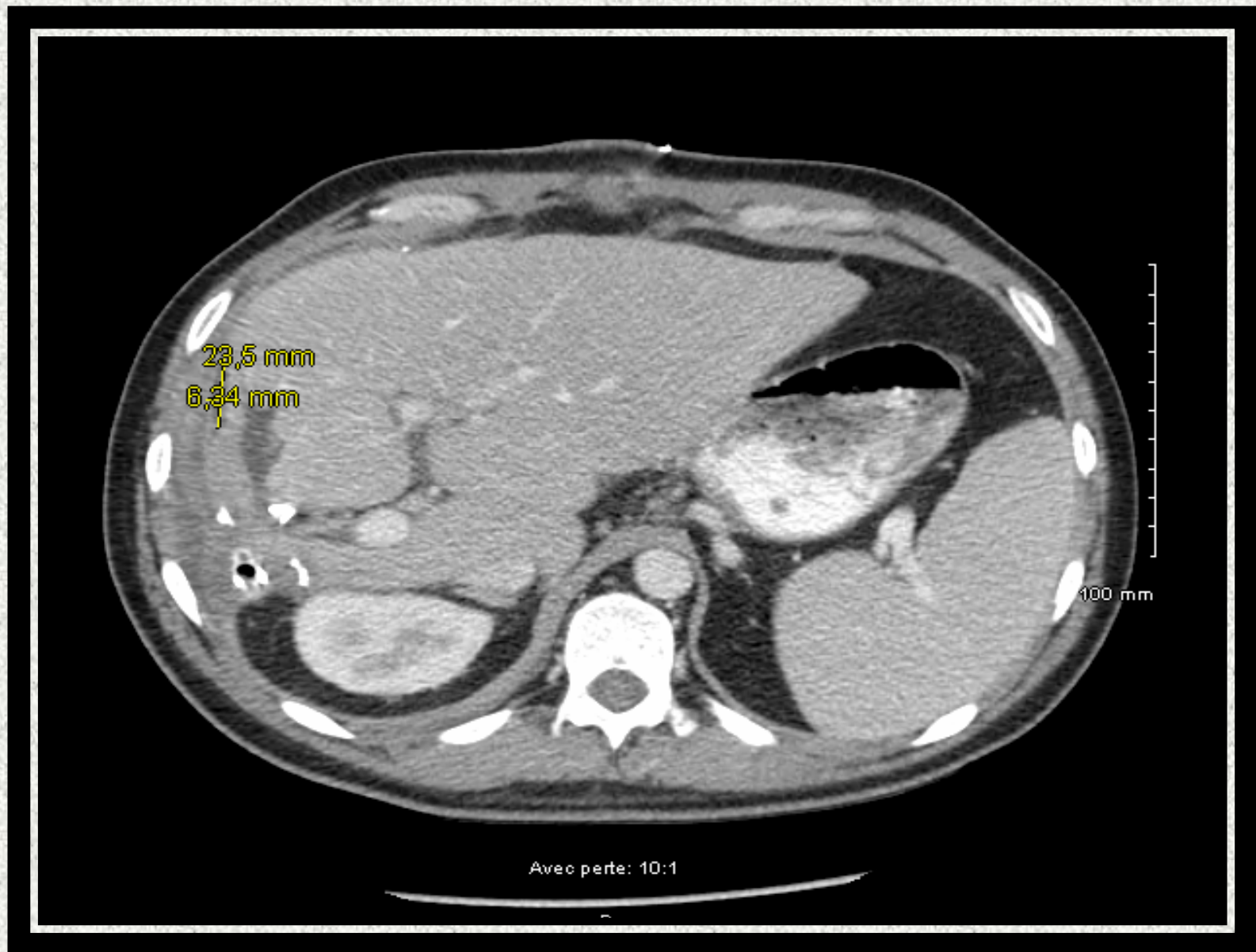
Jour 18



Jour 23 à 36

- ERCP
 - Prothèse biliaire
- Congé
- CT et ERCP contrôle
- Retrait du drain

Jour 36



Questions



Conclusion

- Transfert des trauma hépatiques complexes
 - » Angio-embol
 - » Lésions associées
- Prise en charge non-opératoire si stable
- 'Damage control' si instable
- Complications fréquentes
- Voie d'avenir
 - » Réintervention précoce pour nécrose
 - » Résections anatomiques à considérer
- Collaboration des équipes chirurgicales