

Hemoabdomen

Pablo Donati, V, Msc



Unmasking the Hypovolemic Shock Continuum: The Compensatory Reserve

**Mithun R. Suresh, MD¹, Kevin K. Chung, MD^{2,3},
Alicia M. Schiller, PhD⁴, Aaron B. Holley, MD^{2,3},
Jeffrey T. Howard, PhD¹, and Victor A. Convertino, PhD¹**

Journal of Intensive Care Medicine
1-11

© The Author(s) 2018

Article reuse guidelines:

sagepub.com/journals-permissions

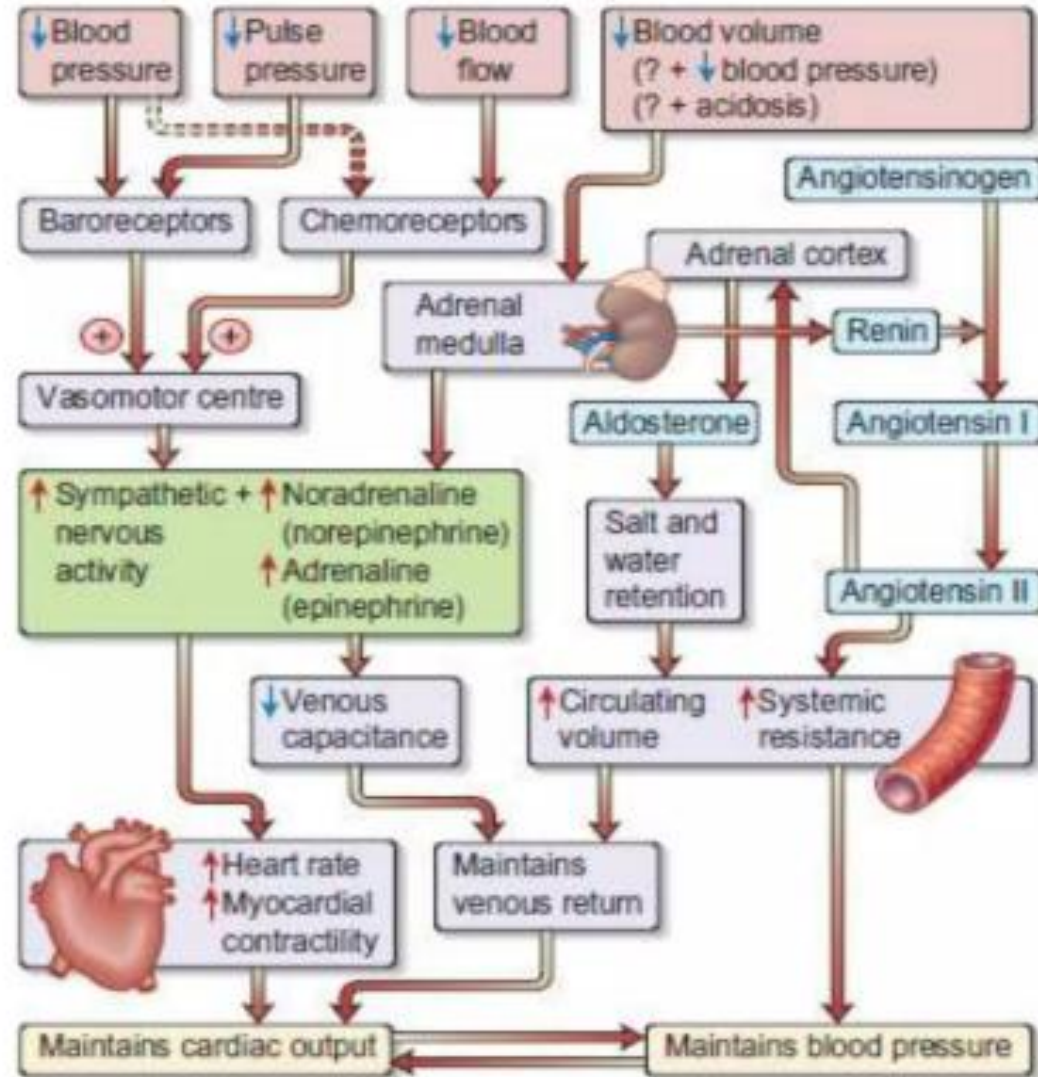
DOI: 10.1177/0885066618790537

journals.sagepub.com/home/jic



There are two forms of hypovolemic shock: “absolute,” which is due to a lower circulating blood volume for a given vascular capacitance (e.g., hemorrhage), or “relative,” resulting from an expanded vascular capacitance for a given blood volume (e.g., sepsis).⁶ In trauma patients, blood loss may cause

Mecanismos compensatorios





Volume Resuscitation in the Acutely Hemorrhaging Patient: Historic Use to Current Applications

Kelly Hall^{1*} and Kenneth Drobatz^{2†}

TABLE 2 | Signs and symptoms of hemorrhage by class as defined in the American college of surgeons advanced trauma life support 10th edition manual.

Parameter	Class I	Class II (mild)	Class III (moderate)	Class IV (severe)
Approximate blood loss	<15%	15–30%	31–40%	>40%
Heart rate	↔	↔ / ↑	↑	↑ / ↑↑
Blood pressure	↔	↔	↔ / ↓	↓
Pulse pressure	↔	↓	↓	↓
Respiratory rate	↔	↔	↔ / ↑	↑
Urine output	↔	↔	↓	↓↓
Glasgow Coma Scale score	↔	↔	↓	↓
Base deficit*	0 to –2 mEq/L	–2 to –6 mEq/L	–6 to –10 mEq/L	–10 mEq/L or less
Need for blood products	Monitor	Possible	Yes	Massive transfusion protocol

Unmasking the Hypovolemic Shock Continuum: The Compensatory Reserve

Mithun R. Suresh, MD¹, Kevin K. Chung, MD^{2,3},
Alicia M. Schiller, PhD⁴, Aaron B. Holley, MD^{2,3},
Jeffrey T. Howard, PhD¹, and Victor A. Convertino, PhD¹

Journal of Intensive Care Medicine

1-11

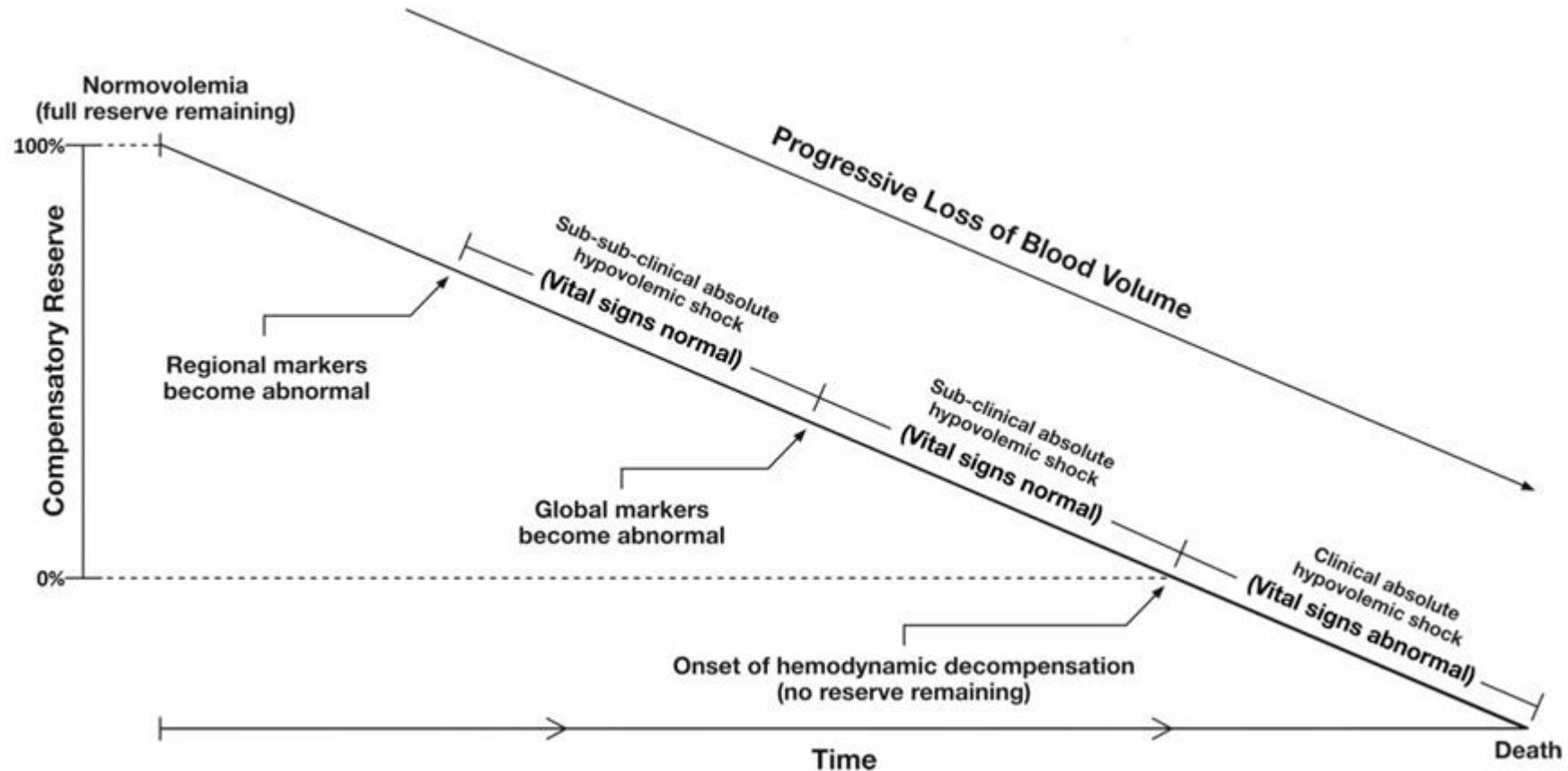
© The Author(s) 2018

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/0885066618790537

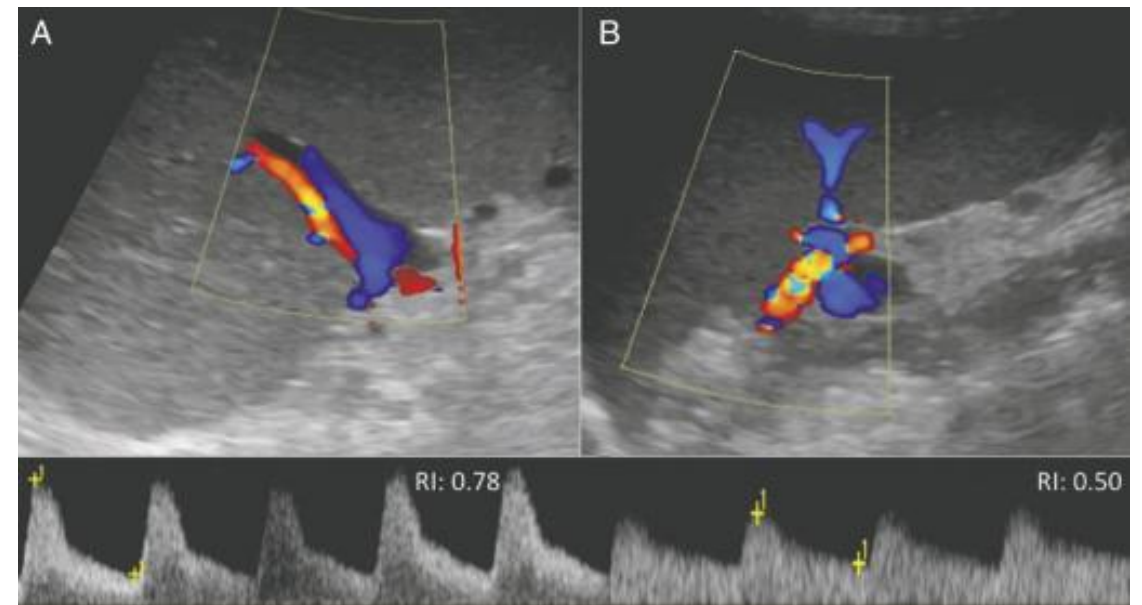
journals.sagepub.com/home/jic



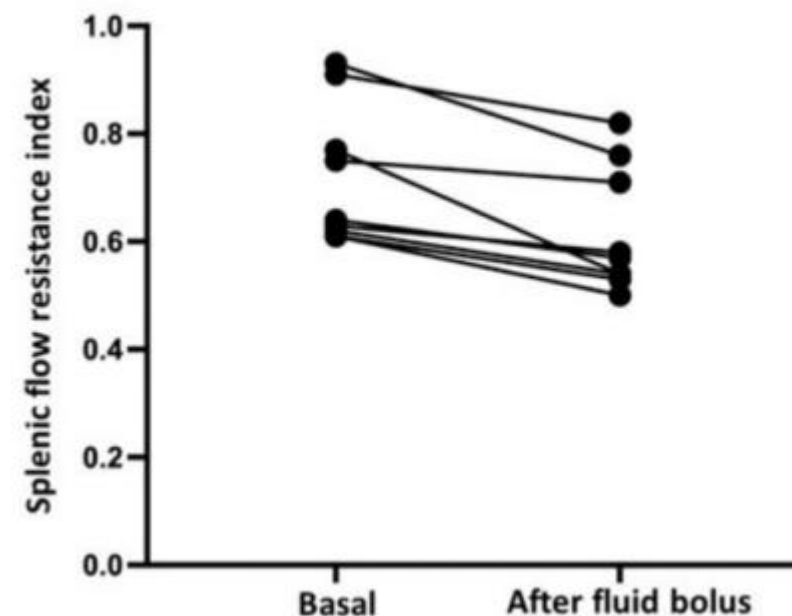
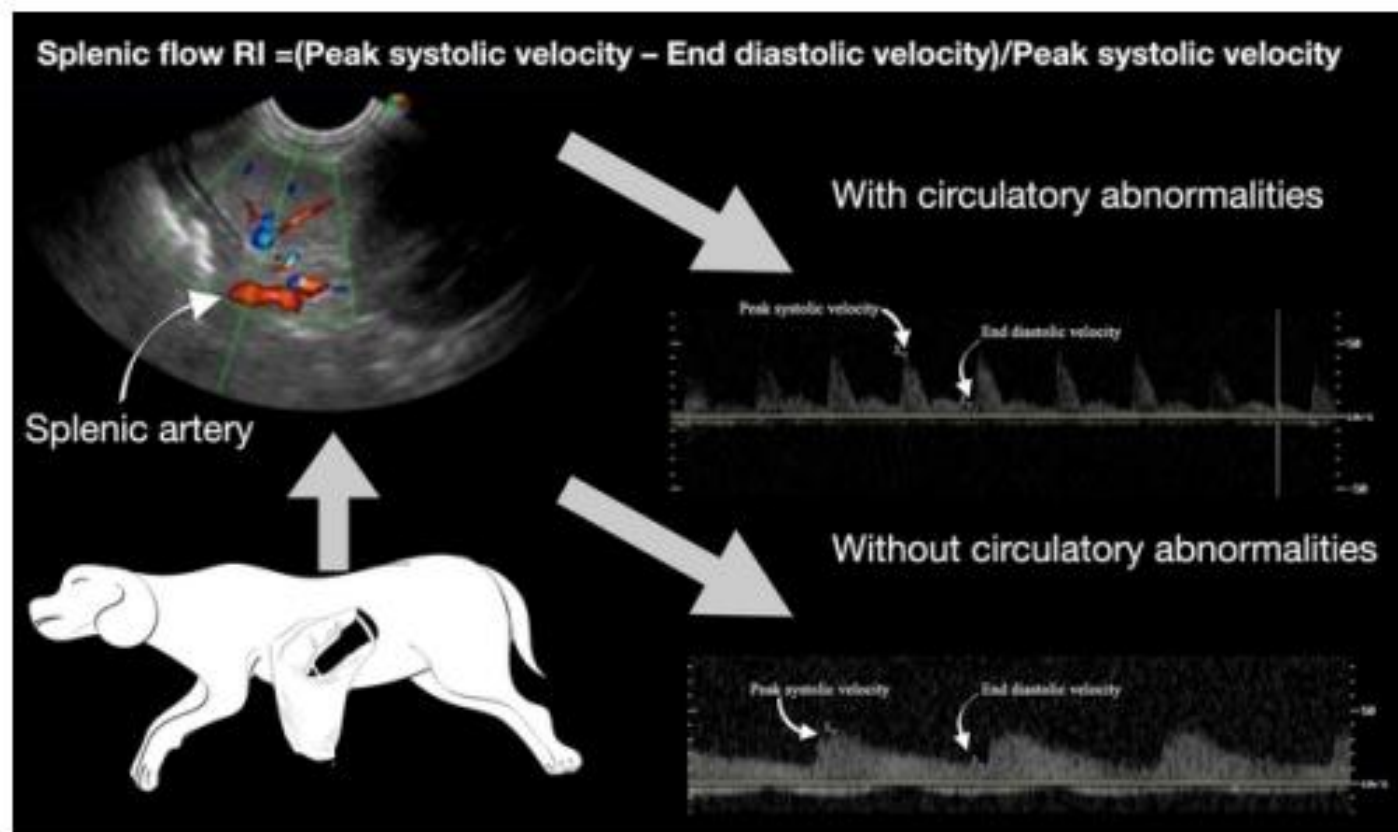
SHOCK, Vol. 38, No. 5, pp. 466–473, 2012

**SPLENIC DOPPLER RESISTIVE INDEX FOR EARLY DETECTION
OF OCCULT HEMORRHAGIC SHOCK AFTER POLYTRAUMA
IN ADULT PATIENTS**

Francesco Corradi,* Claudia Brusasco,[†] Alessandro Garlaschi,[‡] Gregorio Santori,[†]
Antonella Vezzani,[§] Paolo Moscatelli,* and Paolo Pelosi[†]



**Doppler ultrasonography for the splenic flow perfusion
evaluation in dogs with compromised hemodynamics and
tissue hypoperfusion**



Research Article

Recognition, Treatment, and Monitoring of Canine Hypovolemic Shock in First Opinion Practice in the United Kingdom

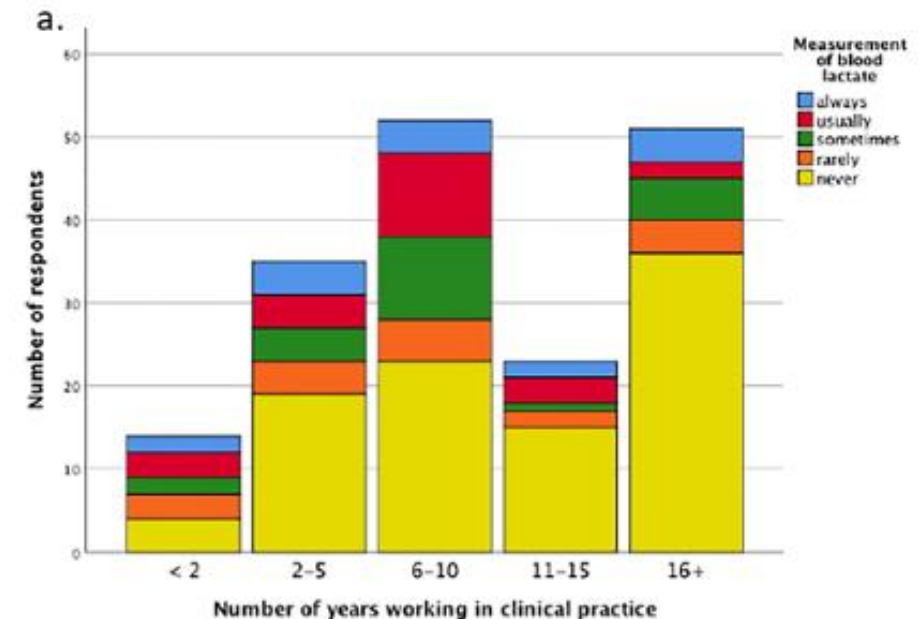


Efa Llewellyn, BVetMed, DACVECC, DECVECC, MRCVS*, Marisa Lourenço, DVM, MRCVS, Alexandra Ambury

Table 3

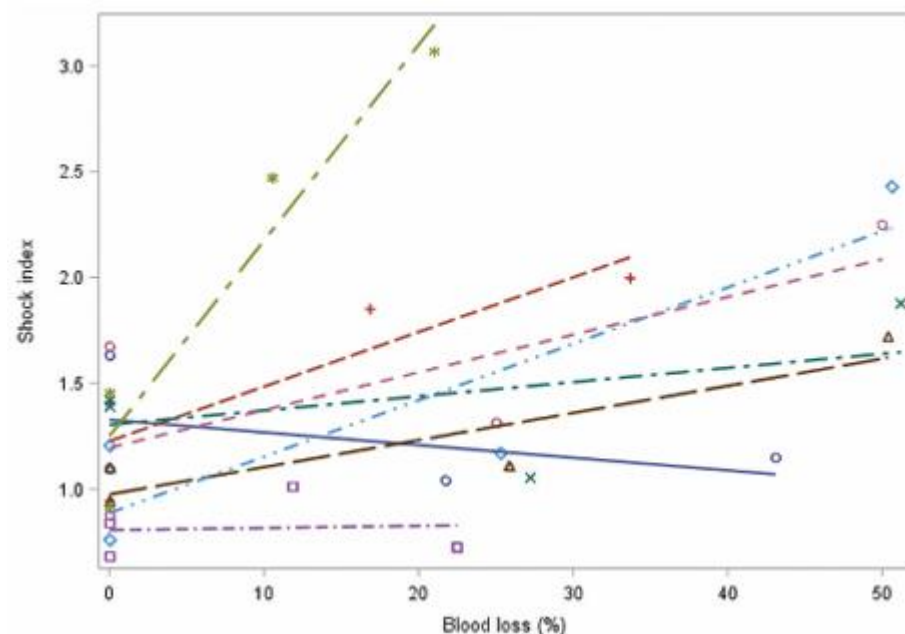
Table Documenting the Physical Examination Parameters Routinely Assessed by the Respondents to an Online Survey Distributed to First Opinion Practitioners to Determine the Presence of Canine Hypovolemic Shock

Physical Examination Parameter	N (%)
Heart rate	173 (97.7)
Pulse quality	165 (93.2)
Capillary refill time	165 (93.2)
Mucous membrane color	163 (92.1)
Mentation	149 (84.2)
Temperature	117 (66.1)
Respiration rate	109 (61.6)
Skin tent	99 (55.9)
Eye position	44 (24.9)



Shock index is positively correlated with acute blood loss and negatively correlated with cardiac output in a canine hemorrhagic shock model

Charles T. Talbot, BVSc, PGDip, MRCVS¹; Kristin M. Zersen, DVM, DACVECC¹; Ann M. Hess, PhD²;
Kelly E. Hall, DVM, MS, DACVECC^{1*}





Retrospective Study

Journal of Veterinary Emergency and Critical Care 23(5) 2013, pp 545–550
doi: 10.1111/vec.12090

Assessment of shock index in healthy dogs and dogs in hemorrhagic shock

Katherine L. Peterson, DVM; Brian T. Hardy, DVM, MS, DACVIM and Kelly Hall, DVM, MS, DACVECC



Original Study

Journal of Veterinary Emergency and Critical Care 00(0) 2013, pp 1–7
doi: 10.1111/vec.12076

Evaluation of the shock index in dogs presenting as emergencies

Adam E. Porter, DVM, DACVECC; Elizabeth A. Rozanski, DVM, DACVIM, DACVECC;
Claire R. Sharp, BVMS, MS, DACVECC; Kursten L. Dixon, BS, CVT; Lori Lyn Price, MAS and
Scott P. Shaw, DVM, DACVECC

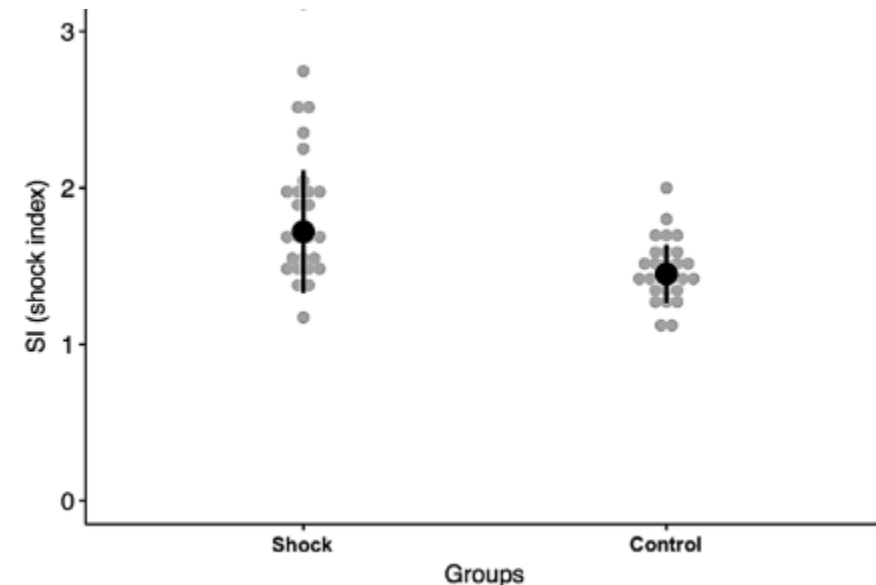
PROSPECTIVE STUDY



Assessment of shock index in healthy cats and in cats presenting to an emergency room with shock

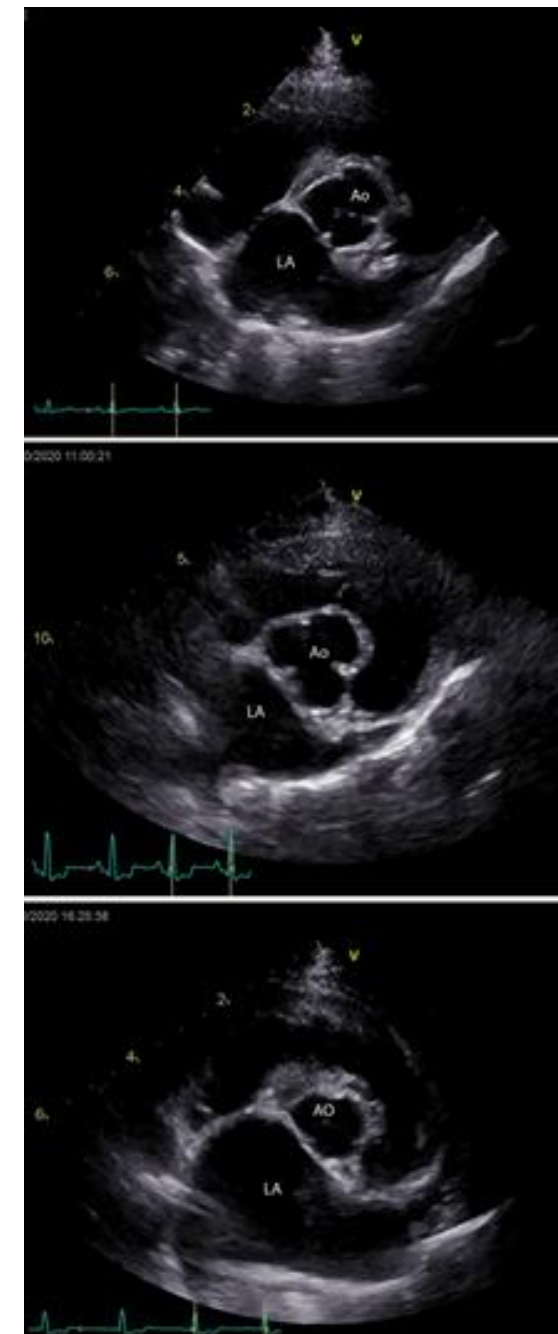
Leandro Fadel DVM, MSc¹ | Rodrigo Cardoso Rabelo DVM, MSc, PhD² |
Denise Tabacchi Fantoni DVM, MSc, PhD³ | Gustavo Machado DMV, MSc, PhD⁴ |
Marina Candido Duarte DVM⁵ | Gabriela da Cruz Schaefer DVM, MSc⁶ |
Mariana Pires Oliveira DVM, MSc⁶ | Jessica de Oliveira Lara Castanheira Fadel DVM,
MSc⁷ | Kamila dos Santos Moraes DVM⁸ | Glaucia Bueno Pereira-Neto DVM, MSc,
PhD⁹ | Fernanda Vieira Amorim da Costa DVM, MSc, PhD¹⁰

Measurements and Main Results: The mean SI in the control group was 1.47 ± 0.2 and was 1.87 ± 0.47 in the shock group ($P = 0.001$). Using equality in sensitivity and specificity of 0.7, an SI cutoff point of 1.54 (95% confidence interval [CI]: 0.49–0.86) was determined with an estimated area under the receiver operating characteristic curve of 0.78 (95% CI: 0.65–0.90). HR, plasma lactate concentration, and RITG did not dif-



Assessment of Volume Status and Fluid Responsiveness in Small Animals

Søren R. Boysen^{1*} and Kris Gommeren²





SonoScape

UCIC00PC611MI 0.8 TIS 0.213 / Jul / 2016 14:11:03

FPS 70

D/G 80/3

GN 246

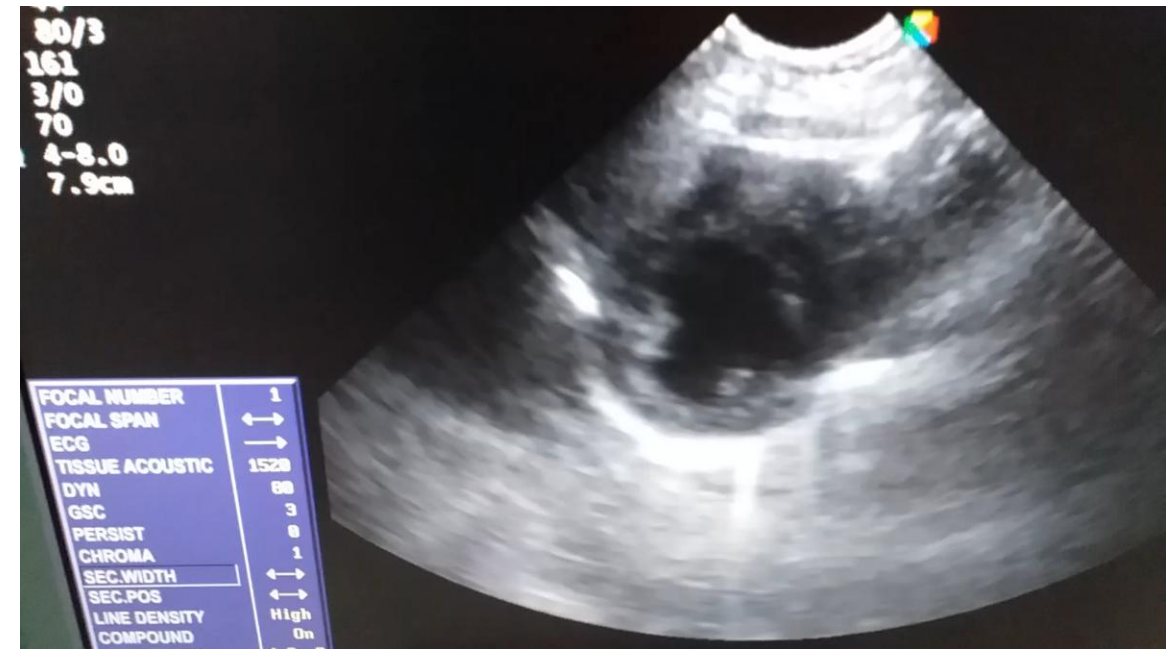
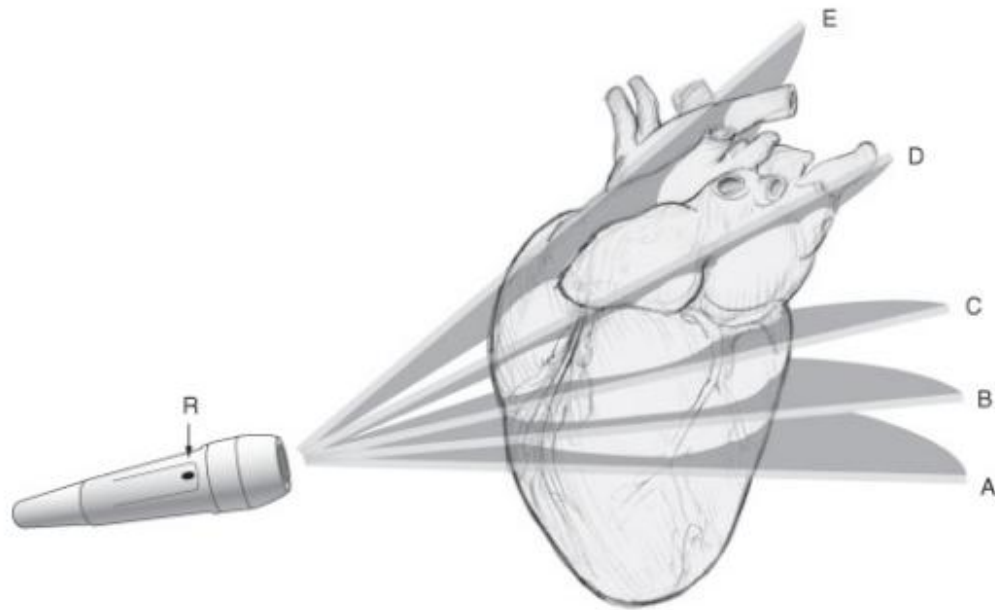
I/P 3/0

PWR 70

FRQ 4-8.0

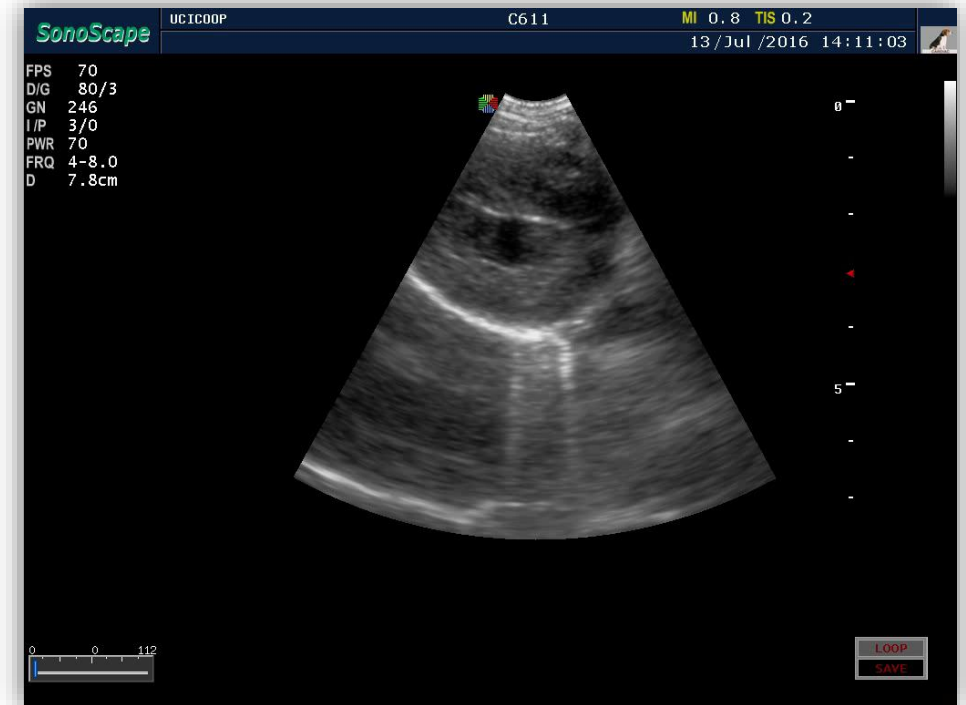
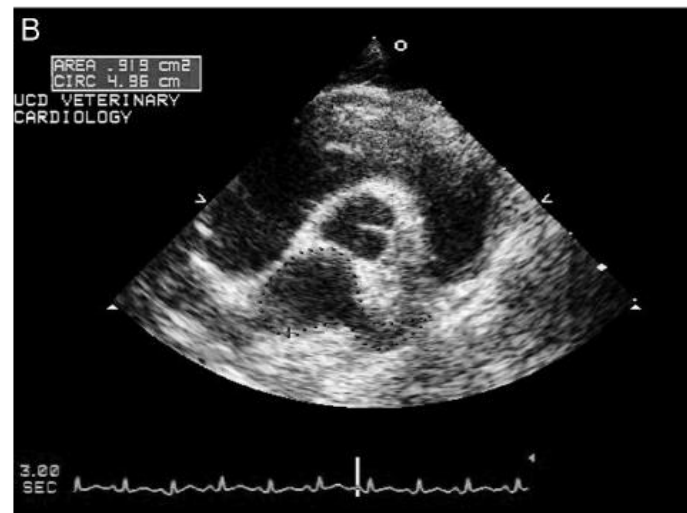
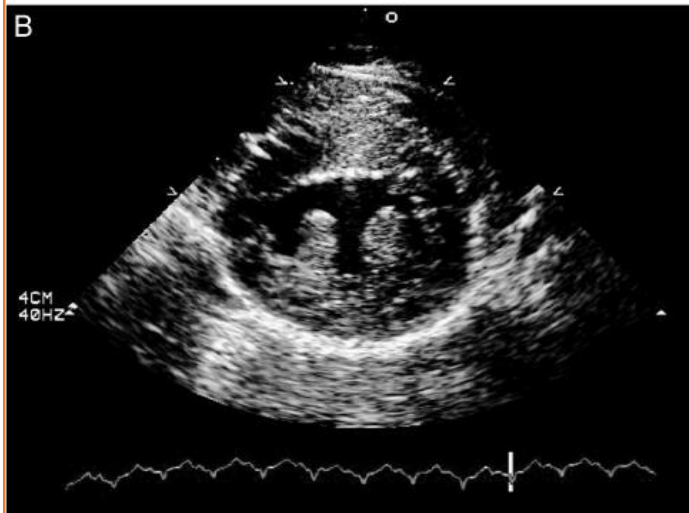
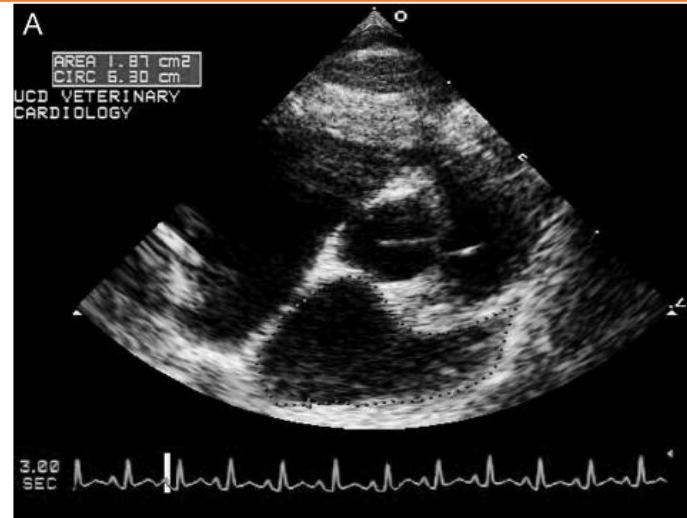
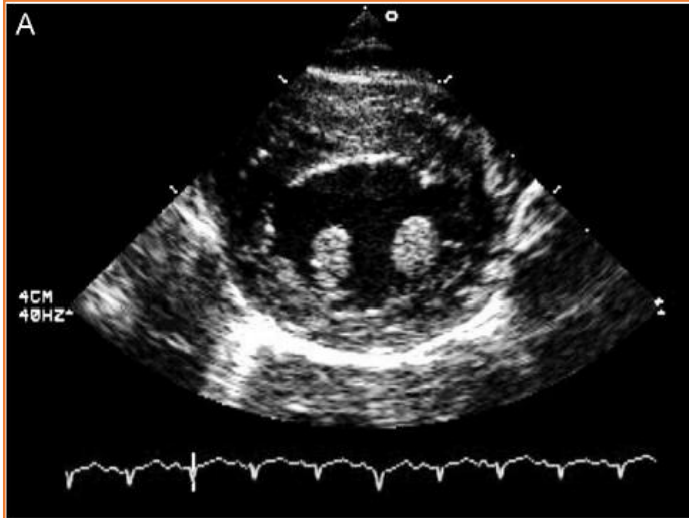
D 7.8cm

LVIDdN

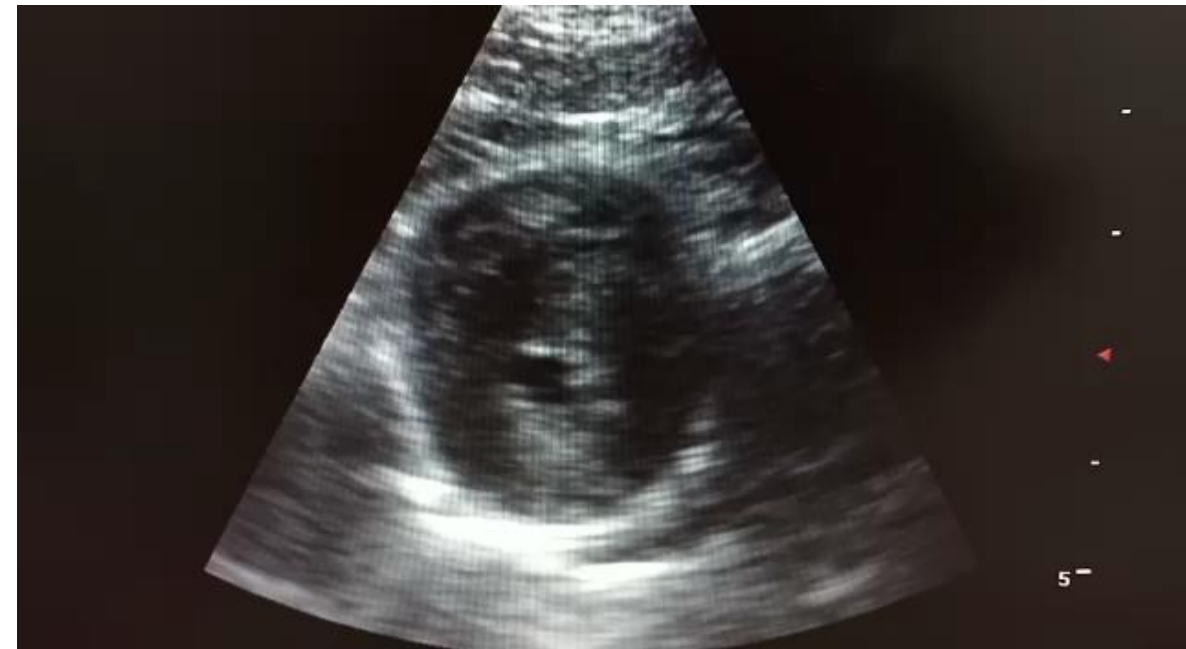
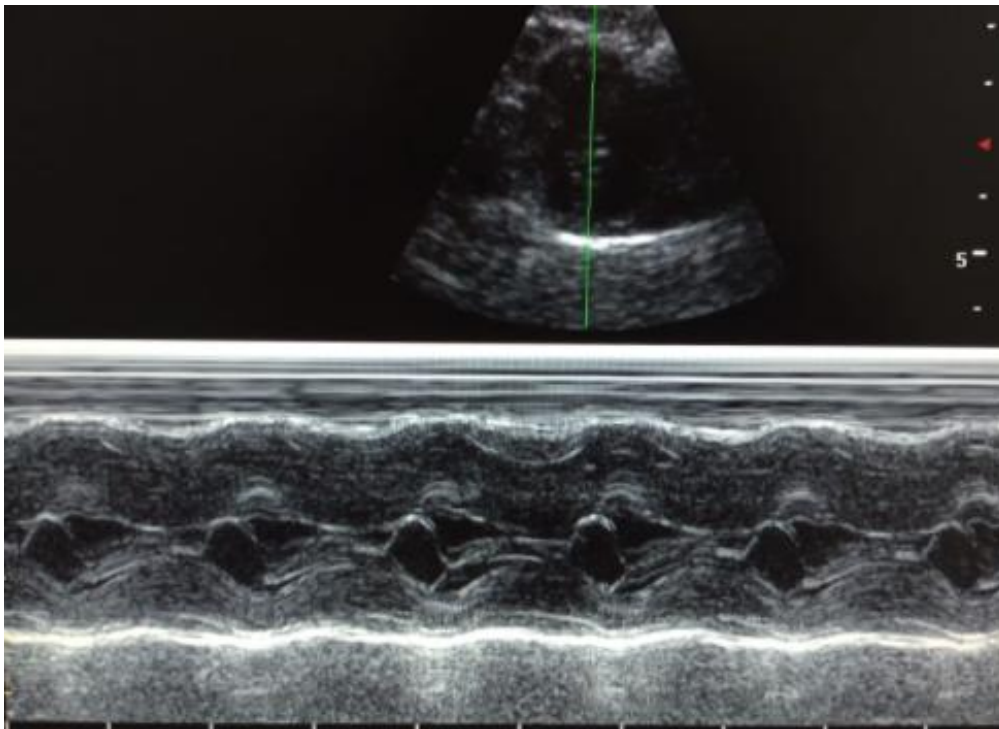
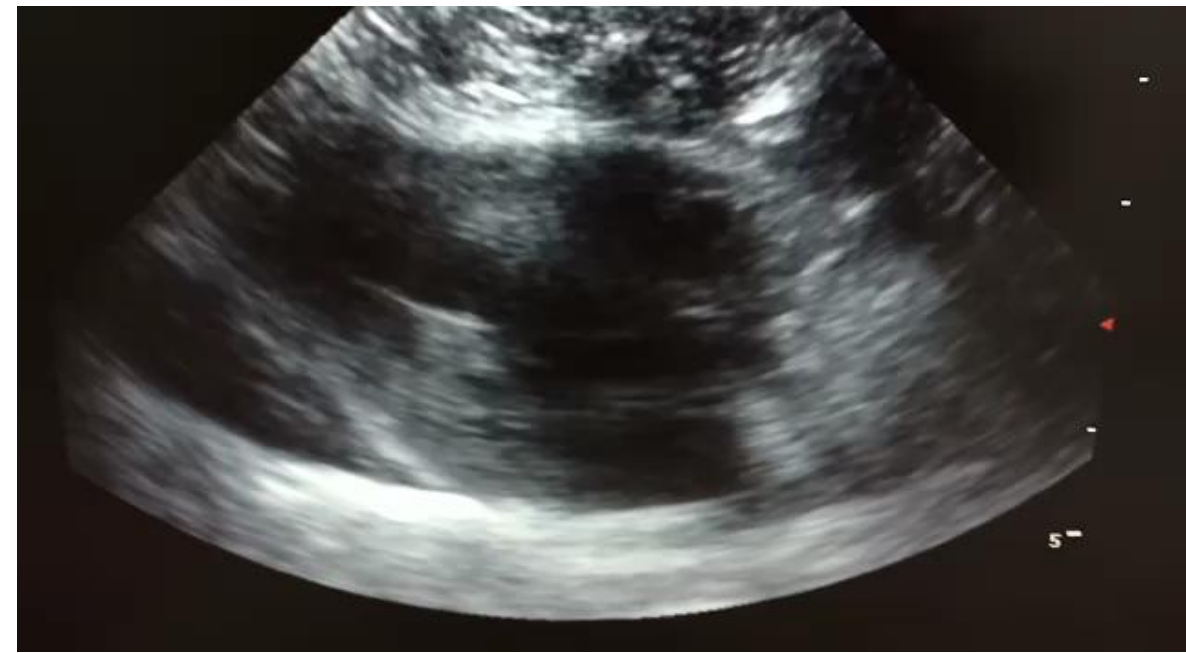


The Effect of Hydration Status on the Echocardiographic Measurements of Normal Cats

F.E. Campbell and M.D. Kittleson



Cardiomiopatía
Hipertrófica

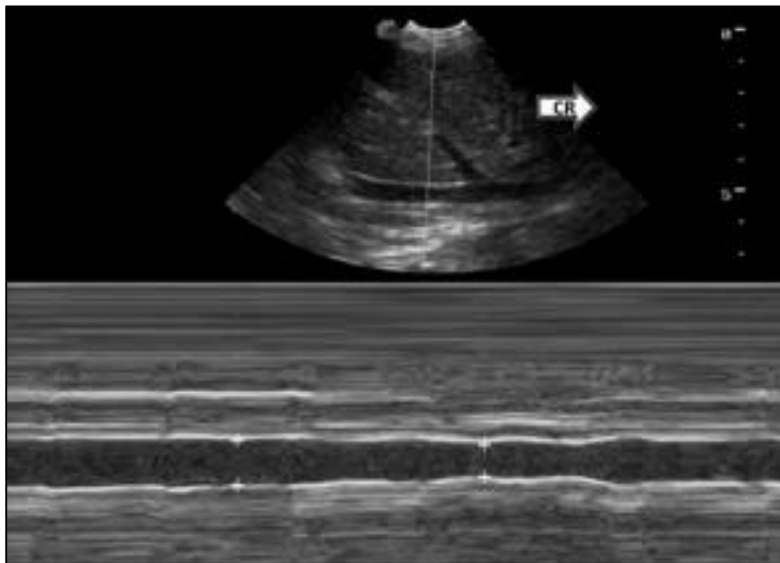


ORIGINAL STUDY

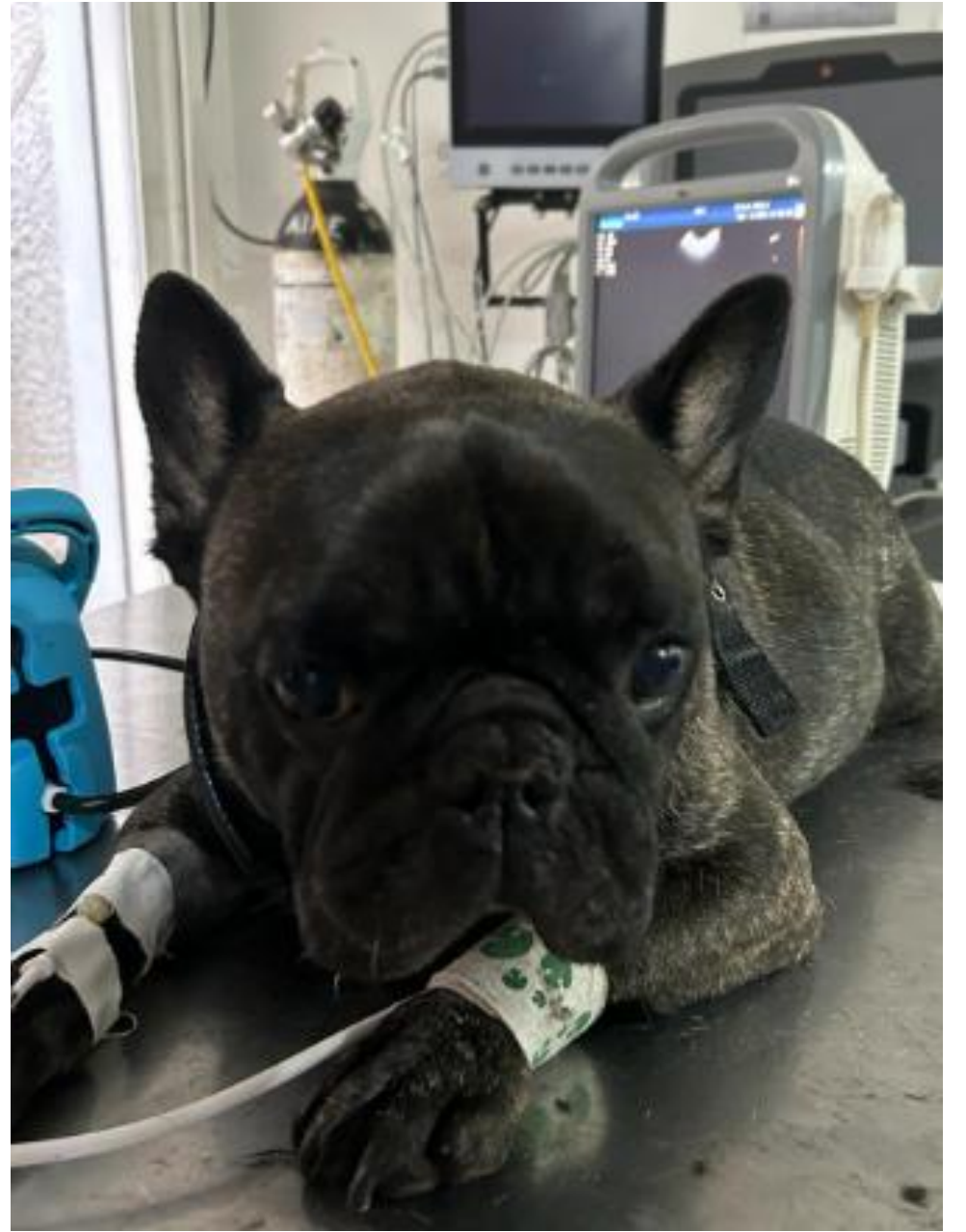


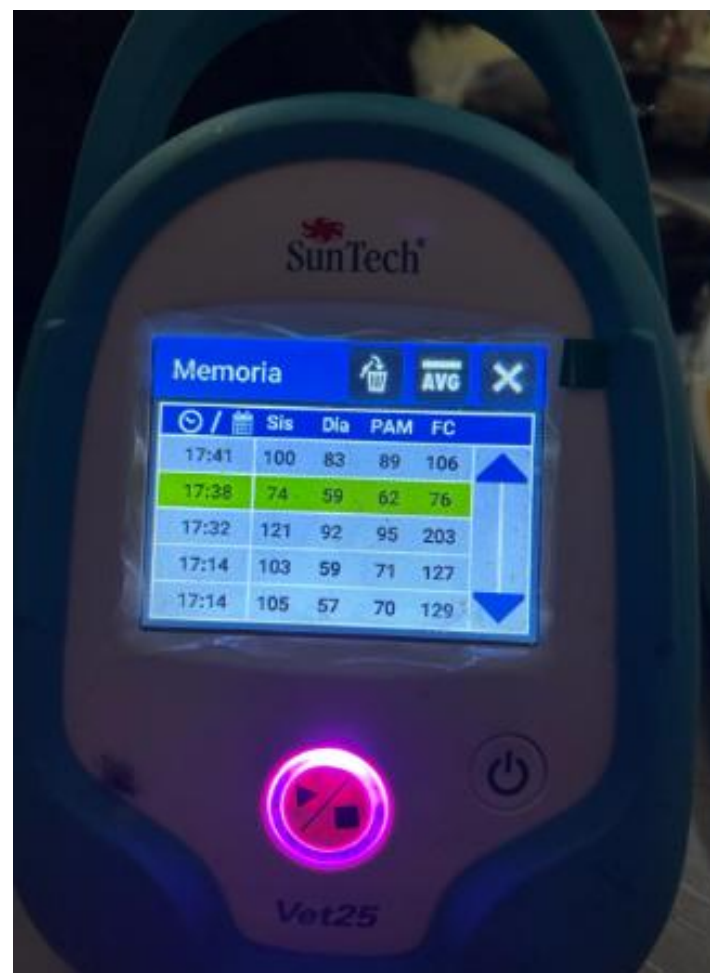
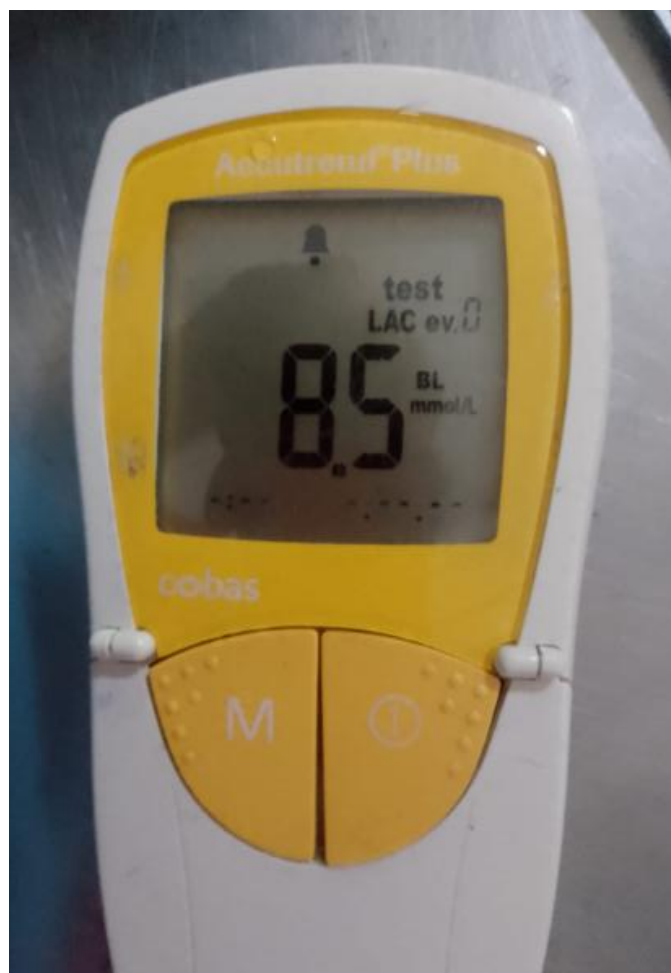
Caudal vena cava collapsibility index as a tool to predict fluid responsiveness in dogs

Pablo A. Donati MS, DVM¹ | Juan M. Guevara DVM¹ | Victoria Ardiles MS, MD² |
Eliana C. Guillemi PhD, DVM¹ | Leonel Londoño DVM³ | Arnaldo Dubin PhD, MD⁴



The cut-off CVCCI that better discriminated between responder and nonresponder dogs to fluids was 26.7% with 100.0% sensitivity and 83.3% specificity, respectively



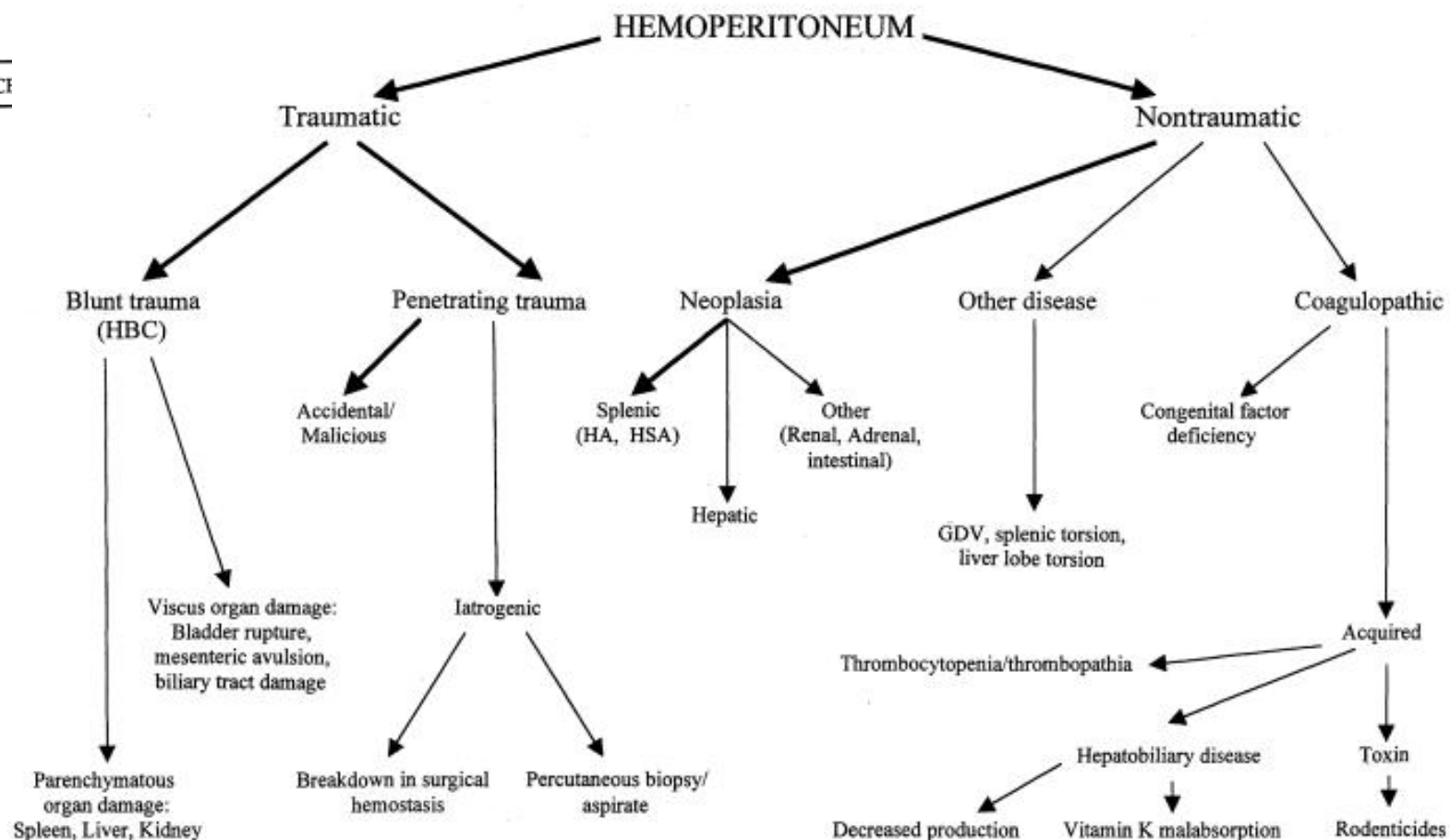


A PRACTICAL APPROACH TO HEMOPERITONEUM IN THE DOG AND CAT

Daniel J. Brockman, BVSc, CVR, CSAO, Carlos M. Mongil, DVM,
Lillian R. Aronson, VMD, and Dorothy Cimino Brown, DVM

VETERINARY CLINICS OF NORTH AMERICA: SMALL ANIMAL PRACTICE

VOLUME 30 • NUMBER 3 • MAY 2000



Evaluation of the validity of the double two-thirds rule for diagnosing hemangiosarcoma in dogs with nontraumatic hemoperitoneum due to a ruptured splenic mass: a systematic review

Ashley R. Schick, DVM, and Janet A. Grimes, DVM, MS, DACVS-SA*

doi.org/10.2460/javma.22.08.0389

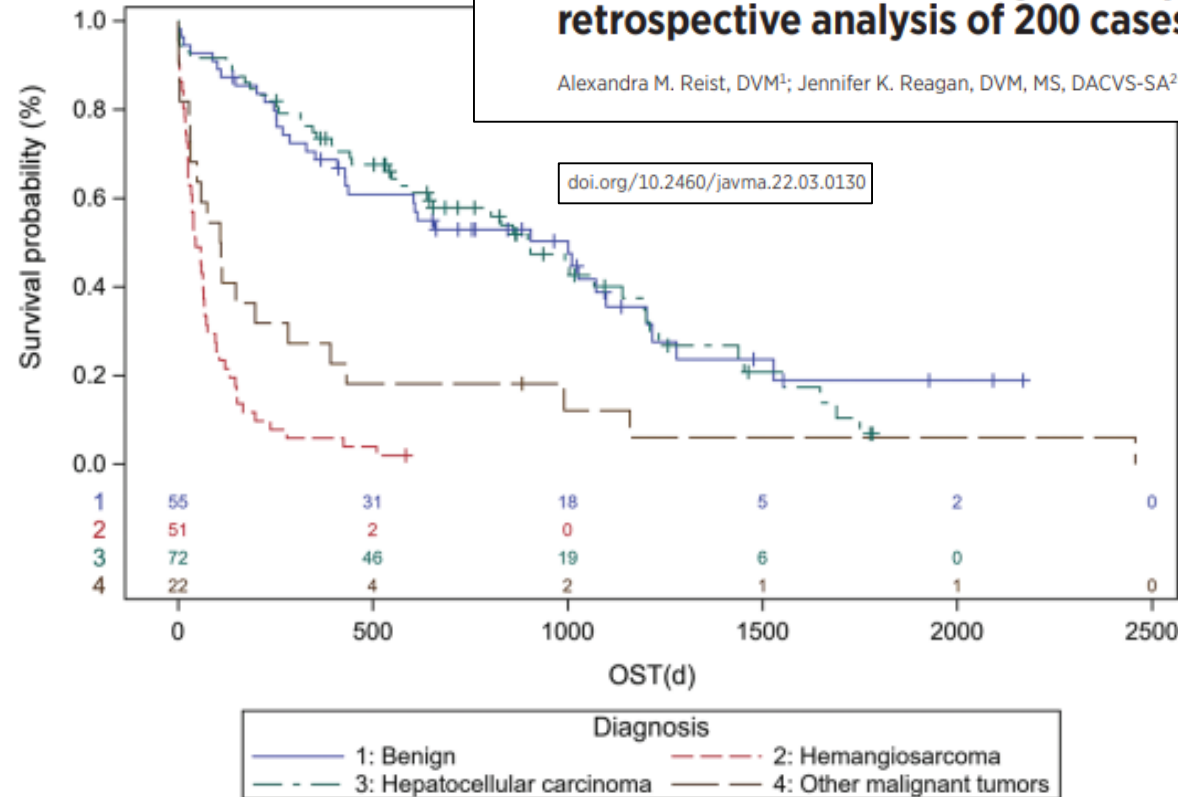
Table 1—Summary of diagnoses for splenic lesions in dogs presenting with nontraumatic hemoperitoneum due to a ruptured splenic mass from 14 articles included in the systematic review.

Article	No. of dogs included	Malignant mass	Benign mass	Hemangiosarcoma	Other malignancy
Aronsohn ²⁵	44	63.6% (28/44)	36.4% (16/44)	100.0% (28/28)	0.0% (0/28)
Corbin ³⁰	23	56.5% (13/23)	43.5% (10/23)	69.2% (9/13)	30.8% (4/13)
Davies ³¹	78	87.2% (68/78)	12.8% (10/78)	91.2% (62/68)	8.8% (6/68)
Fernandez ³²	115	66.1% (76/115)	33.9% (39/115)	78.9% (60/76)	21.1% (16/76)
Fleming ²⁴	210	84.3% (177/210)	15.7% (33/210)	88.7% (157/177)	11.3% (20/177)
Hammond ²²	71	76.1% (54/71)	23.9% (17/71)	92.6% (50/54)	7.4% (4/54)
Johnson ³³	39	94.9% (37/39)	5.1% (2/39)	89.2% (33/37)	10.8% (4/37)
Levinson ³⁴	28	78.6% (22/28)	21.4% (6/28)	81.8% (18/22)	18.2% (4/22)
Mallinckrodt ¹⁹	40	65.0% (26/40)	35.0% (14/40)	92.3% (24/26)	7.7% (2/26)
Marino ³⁵	23	52.2% (12/23)	47.8% (11/23)	100.0% (12/12)	0.0% (0/12)
Sherwood ³⁶	91	76.9% (70/91)	23.1% (21/91)	82.9% (58/70)	17.1% (12/70)
Stewart ²¹	40	62.5% (25/40)	37.5% (15/40)	96.0% (24/25)	4.0% (1/25)
Vnuk ³⁷	19	52.6% (10/19)	47.4% (9/19)	90.0% (9/10)	10.0% (1/10)
Wendelburg ²	329	67.5% (222/329)	32.5% (107/329)	85.1% (189/222)	14.9% (33/222)
Total	1,150	73.0% (840/1,150)	27.0% (310/1,150)	87.3% (733/840)	12.7% (107/840)

Histopathologic findings and survival outcomes of dogs undergoing liver lobectomy as treatment for spontaneous hemoabdomen secondary to a ruptured liver mass: retrospective analysis of 200 cases (2012–2020)

Alexandra M. Reist, DVM¹; Jennifer K. Reagan, DVM, MS, DACVS-SA^{2*}; Shawna K. Fujita, DVM¹; Alexis M. Walny, BS²

doi.org/10.2460/javma.22.03.0130



CLINICAL RELEVANCE

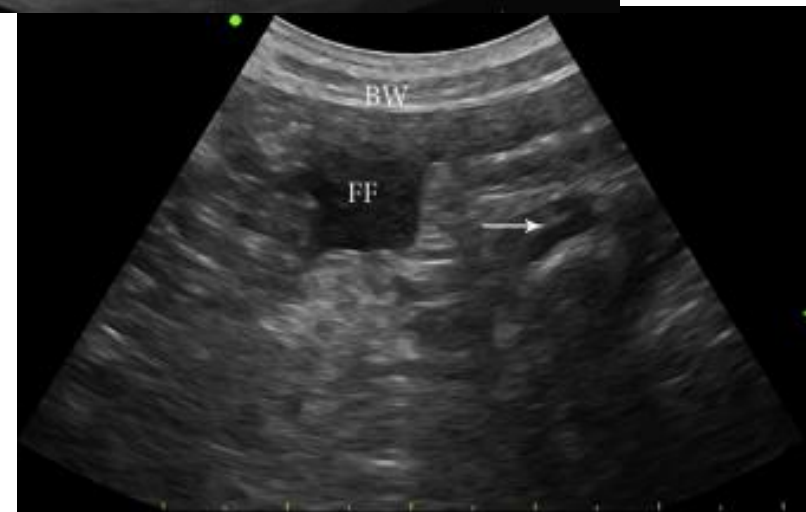
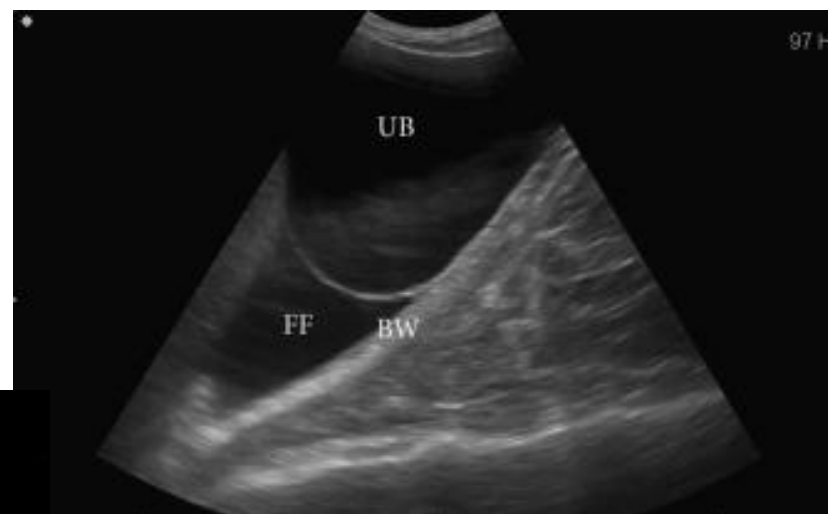
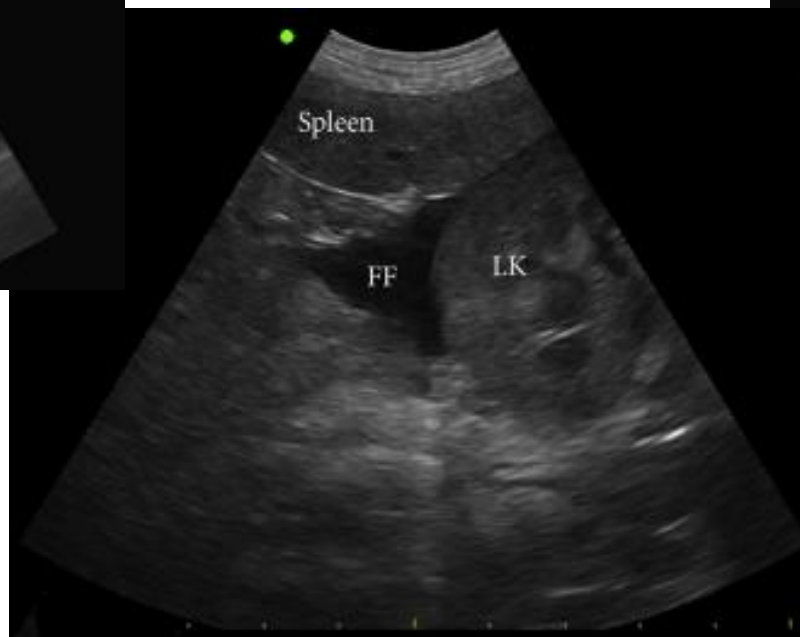
The majority of dogs (63.5%) were diagnosed with well-differentiated hepatocellular carcinoma or a benign process, resulting in favorable long-term survival. The distribution of histopathology for ruptured liver masses resulting in hemoperitoneum has not been previously reported and may be useful for client discussions prior to surgery.

The Use of Ultrasound for Dogs and Cats in the Emergency Room

AFAST and TFAST

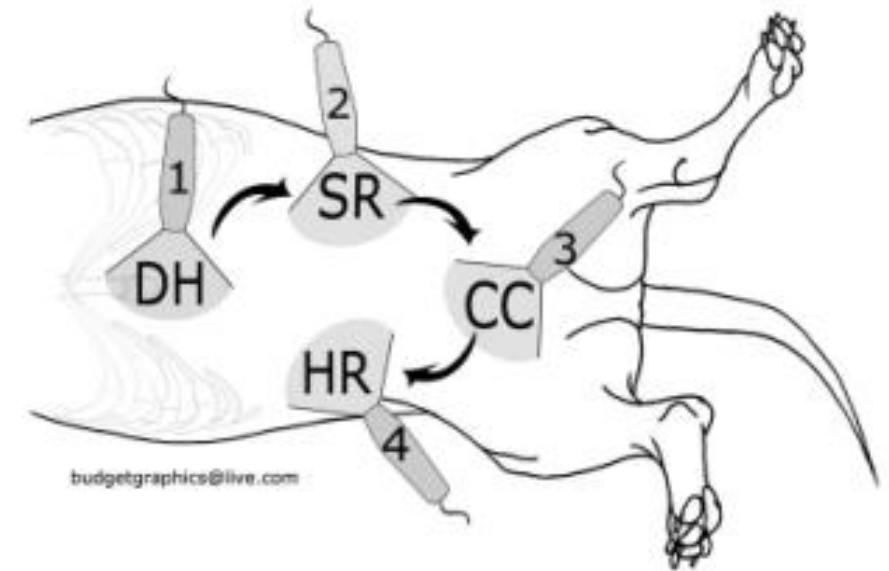
Vet Clin Small Anim 43 (2013) 773–797
<http://dx.doi.org/10.1016/j.cvsm.2013.03.011>

Søren R. Boysen, DVM^{a,*}, Gregory R. Lisciandro, DVM^b



Evaluation of an abdominal fluid scoring system determined using abdominal focused assessment with sonography for trauma in 101 dogs with motor vehicle trauma

Gregory R. Lisciandro, DVM, DABVP, DACVECC; Michael S. Lagutchik, DVM, MS, DACVECC; Kelly A. Mann, DVM, MS, DACVR; Geoffrey T. Fosgate, DVM, PhD, DACVPM; Elizabeth G. Tiller, DVM; Nicholas R. Cabano, DVM; Leslie D. Bauer, DVM; Bradley P. Book, DVM, DABVP and Philip K. Howard, DVM



Measurements and Main Results – An AFS was assigned to each dog based on the number of AFAST fluid-positive quadrants identified using a 4-point scale: AFS 0 (negative for fluid in all quadrants) to AFS 4 (positive for fluid in all quadrants). Free abdominal fluid was identified in 27 of 101 dogs (27%). Dogs with AFS scores of 3 or 4 (14/27 [52%] AFS-positive dogs) experienced more marked decreases in packed cell volume and total plasma protein, increases in alanine aminotransferase, and needed more blood transfusions than dogs with lower AFS scores and AFS-negative dogs. Serial AFAST was performed in 71% of dogs (71/101); 17% (12/71) of these cases changed AFS score, and 75% (9/12) of the changes were higher (worsened) AFS, correlating with increasing amounts of free abdominal fluid. Ninety-eight percent of the study population was a primary presentation. Overall, median time from trauma to initial AFAST was 60 minutes, and median AFAST examination time was 3 minutes.

¿Cómo
procedemos?





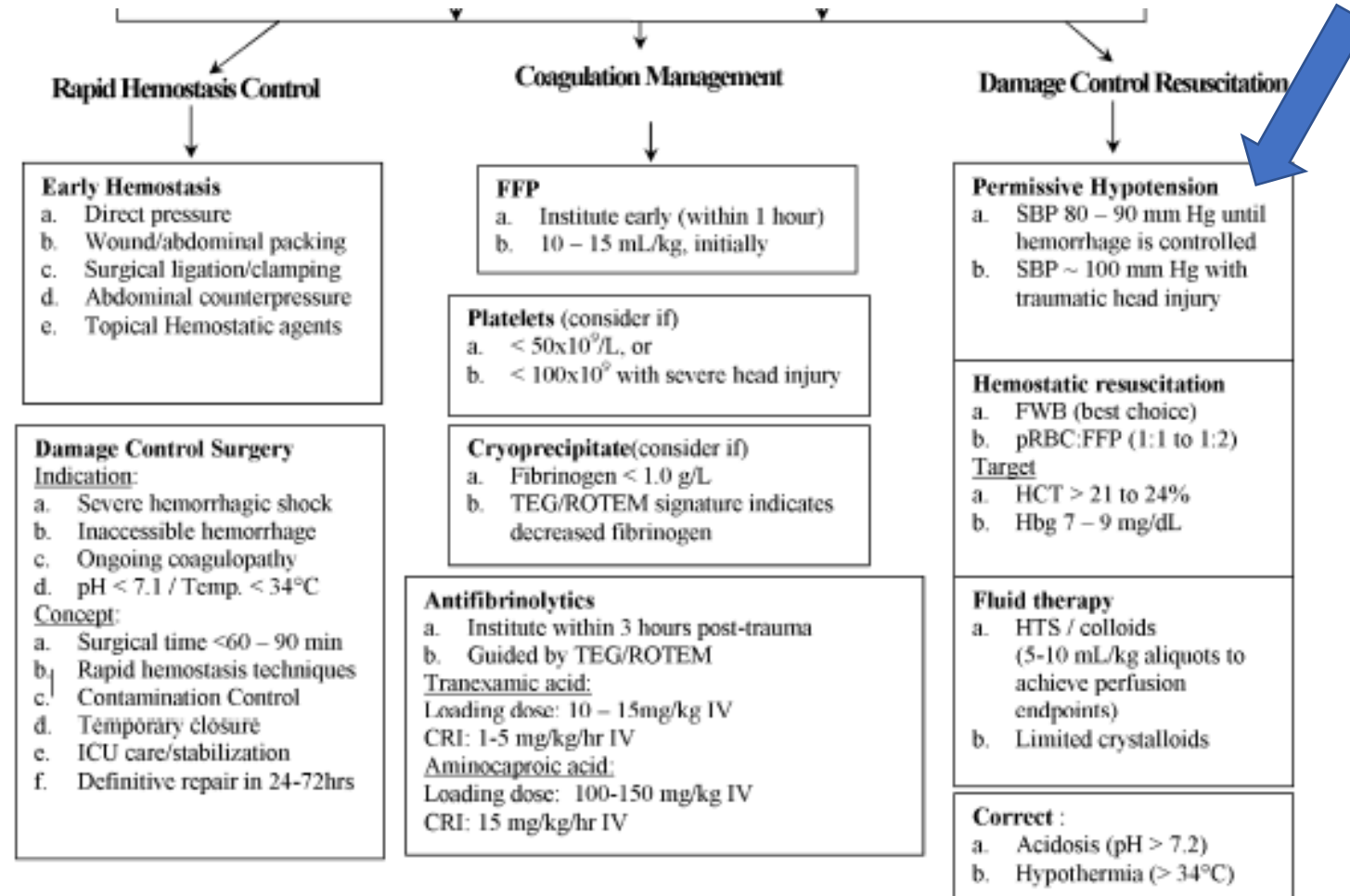
socrative

by MasteryConnect



Traumatic coagulopathy-Part 2: Resuscitative strategies

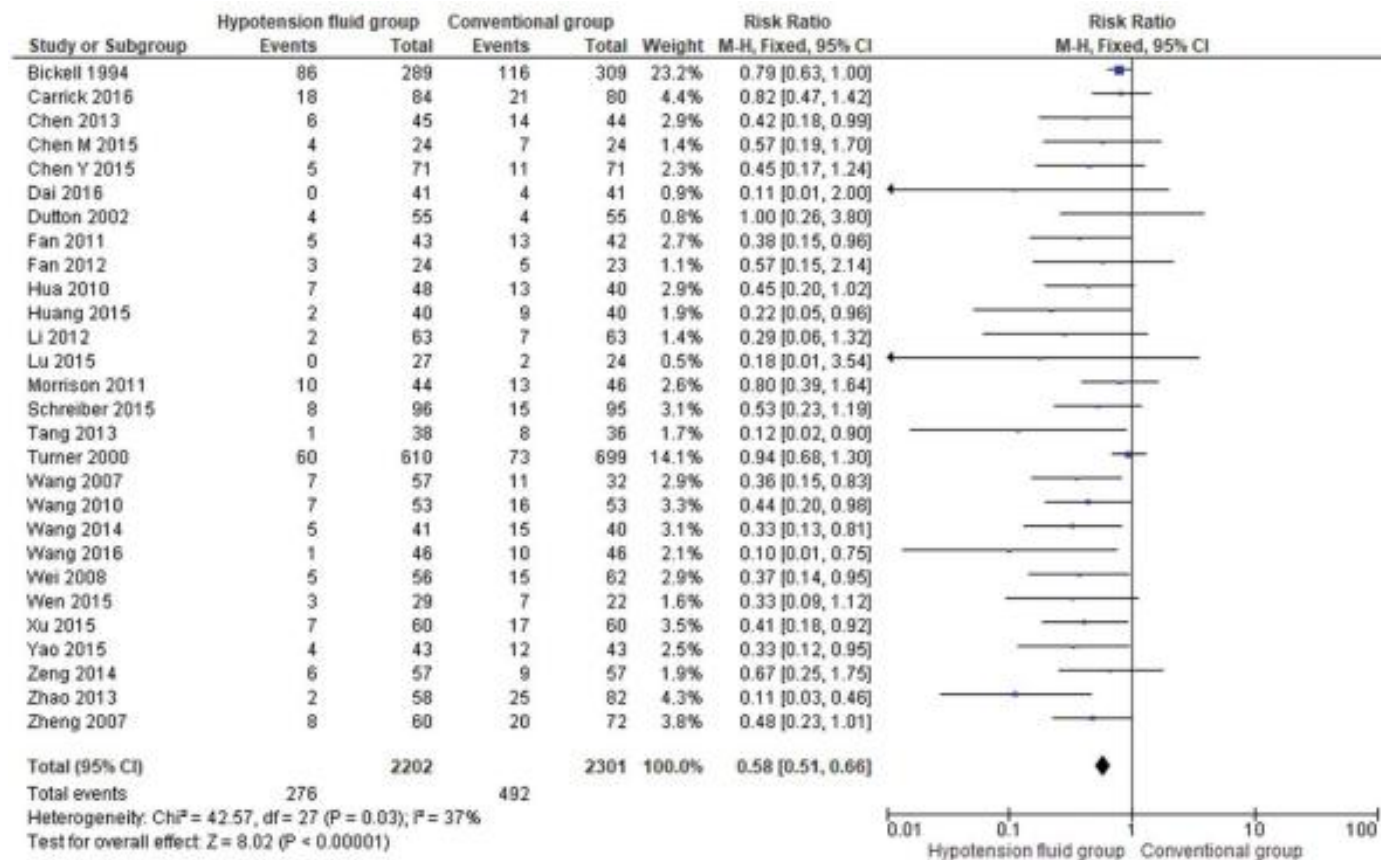
Lee Palmer, DVM, DACVECC and Linda Martin, DVM, MS, DACVECC



Effectiveness and safety of hypotension fluid resuscitation in traumatic hemorrhagic shock: A systematic review and meta-analysis of randomized controlled trials

Kamil Safiejko¹, Jacek Smereka^{2,3}, Krzysztof J. Filipiak⁴, Agnieszka Szarpak⁵, Marek Dabrowski⁶, Jerzy R. Ladny^{3,7}, Milosz J. Jaguszewski⁸, Lukasz Szarpak^{3,9}

Cardiology Journal
2022, Vol. 29, No. 3, 463–471
DOI: 10.5603/CJ.a2020.0096



However, it should be remembered that the hypotension should not last longer than 1 hour

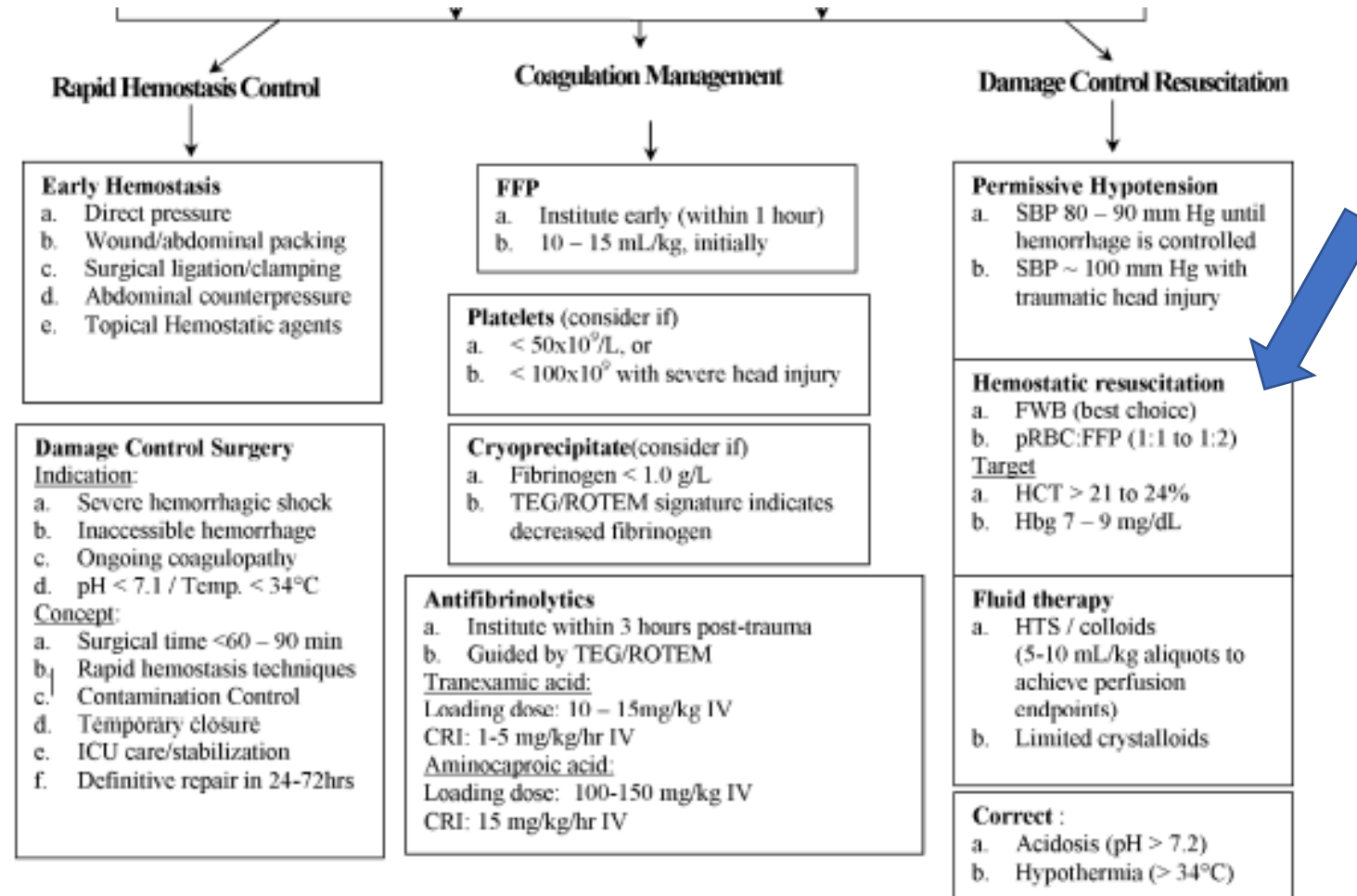


Con que expandimos?



Traumatic coagulopathy-Part 2: Resuscitative strategies

Lee Palmer, DVM, DACVECC and Linda Martin, DVM, MS, DACVECC



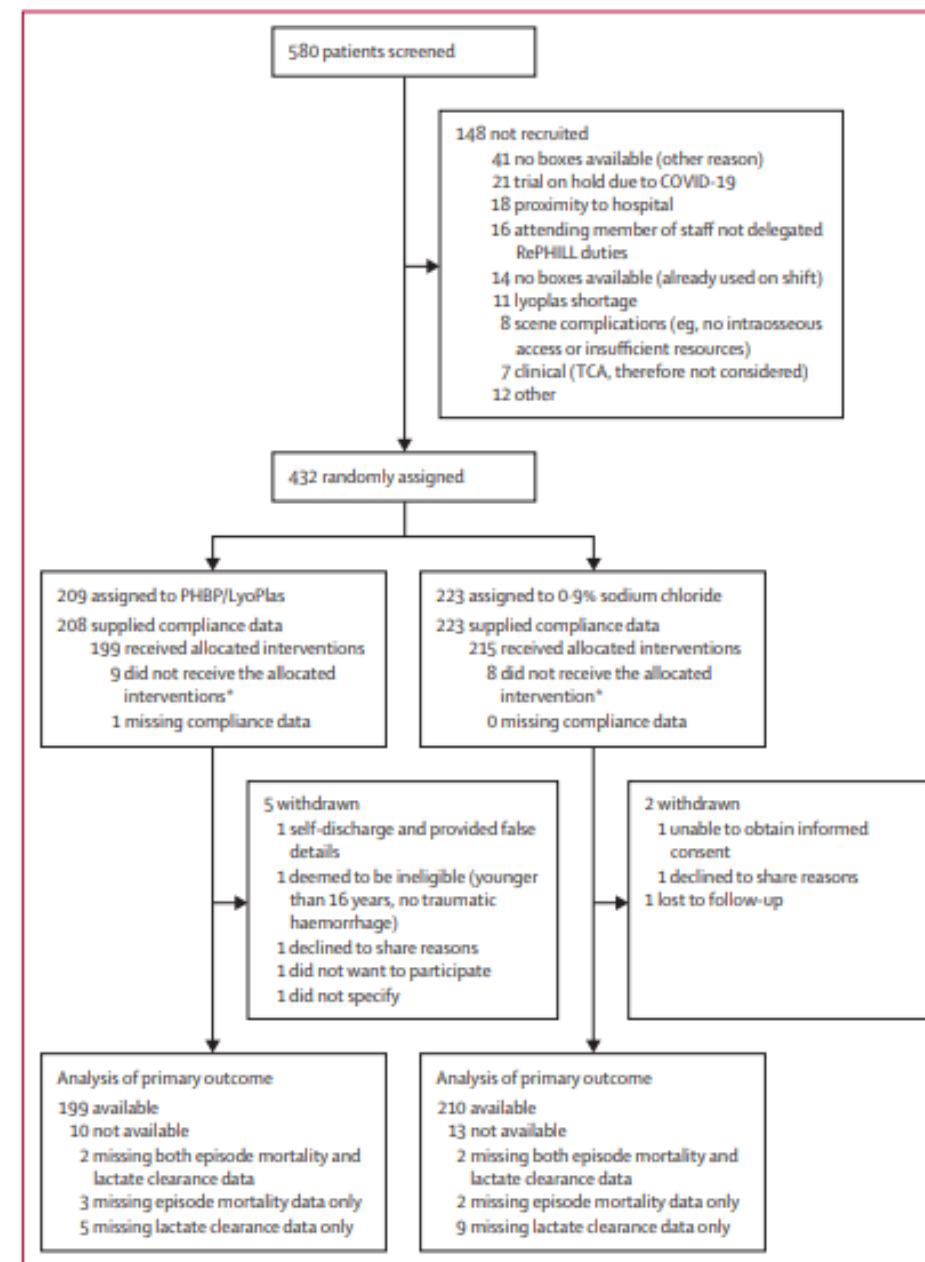


Resuscitation with blood products in patients with trauma-related haemorrhagic shock receiving prehospital care (RePHILL): a multicentre, open-label, randomised, controlled, phase 3 trial



Nicholas Crombie, Heidi A Doughty, Jonathan R B Bishop, Amisha Desai, Emily F Dixon, James M Hancox, Mike J Herbert, Caroline Leech, Simon J Lewis, Mark R Nash, David N Naumann, Gemma Slinn, Hazel Smith, Iain M Smith, Rebekah K Wale, Alastair Wilson, Natalie Ives, Gavin D Perkins, on behalf of the RePHILL collaborative group*

The search identified low quality evidence from 27 observational studies (16 case series and 11 comparative studies). No definitive evidence of benefit was found for prehospital blood components and survival (odds ratio for mortality 1.29 [95% CI 0.84–1.96]), physiology, or in-hospital transfusion requirements. Transfusion reactions were rare,



	Packed red blood cells and lyophilised plasma group	0.9% sodium chloride group	Adjusted risk ratio (95% CI)	Adjusted average difference (95% CI)
Primary outcome				
Episode mortality or failure to clear lactate, or both	128/199 (64%)	136/210 (65%)	1.01 (0.88 to 1.17)*; p=0.86	-0.025% (-9 to 9)†; p=1.00
Secondary outcomes				
Episode mortality	88/203 (43%)	99/218 (45%)	0.97 (0.78 to 1.20)*; p=0.75	-3% (-12 to 7)†; p=0.57
Failure to clear lactate	98/196 (50%)	113/206 (55%)	0.94 (0.78 to 1.13)*; p=0.52	-5% (-14 to 5)†; p=0.33
Post-intervention fluids, mL	123 (310), 207	160 (389), 221	..	-34 (-101 to 32)‡; p=0.31
Time to ED arrival, mins				
From 999 call	90 (35)	91 (35)	..	0.60 (-6.14 to 7.35)‡; p=0.86
From randomisation	37 (22)	35 (22)	..	3.03 (-1.40 to 7.46)‡; p=0.18
Vital signs at ED arrival				
Heart rate, bpm	107 (29)	105 (24)	..	-0.80 (-5.83 to 4.23)§; p=0.76
Systolic blood pressure, mm Hg	114 (27)	114 (29)	..	-1.19 (-8.19 to 5.82)§; p=0.74
Diastolic blood pressure, mm Hg	75 (24)	72 (24)	..	2.26 (-3.77 to 8.29)§; p=0.46
Respiratory rate per min	20 (6.5)	19 (5.6)	..	0.59 (-0.79 to 1.97)§; p=0.40
Oxygen saturation	97 (5%)	97 (5%)	..	0.48 (-0.86 to 1.82)§; p=0.48
Laboratory results (ED arrival)				
Lactate concentration, mmol/L	7.04 (4.50)	6.93 (4.58)	..	-0.08 (-0.97 to 0.82)§; p=0.87
INR >1.5	12/84 (14%)	12/74 (16%)	0.91 (0.44 to 1.90)*; p=0.80	..
Haemoglobin concentration, g/L	133 (19), 154	118 (23), 152	..	15 (10 to 19)‡; p<0.0001
Total blood product up to 24 h after ED arrival				
PRBC	6.34 (7.09), 209	4.41 (6.17), 223	..	1.80 (0.58 to 3.01)‡; p=0.004
Plasma	5.04 (5.56), 209	3.37 (5.04), 223	..	1.54 (0.57 to 2.50)‡; p=0.002
Death				
Within 3 h	32/197 (16%)	46/208 (22%)	0.75 (0.50 to 1.13)*; p=0.17	-7% (-15 to 1)†; p=0.08
Within 30 days	86/204 (42%)	99/219 (45%)	0.94 (0.76 to 1.17)*; p=0.59	-4% (-13 to 6)†; p=0.44

ORIGINAL STUDY



A prospective randomized open-label trial on the comparative effects of 6% hydroxyethyl starch 130/0.4 versus polyionic isotonic crystalloids on coagulation parameters in dogs with spontaneous hemoperitoneum

Claudia Iannucci Dr med vet, DACVECC¹  | Daniel Dirkmann Dr med PD² |
Judith Howard Dr med vet, DACVIM³ | Katja N. Adamik Dr med vet PD, DACVECC,
DECVECC¹

Clot formation time in EXTEM was significantly prolonged ($P = 0.037$), and maximum clot firmness was significantly decreased ($P = 0.038$) in the HES group compared to the CRYs group at T1

Research

Open Access

Resuscitation of haemorrhagic shock with normal saline vs. lactated Ringer's: effects on oxygenation, extravascular lung water and haemodynamics

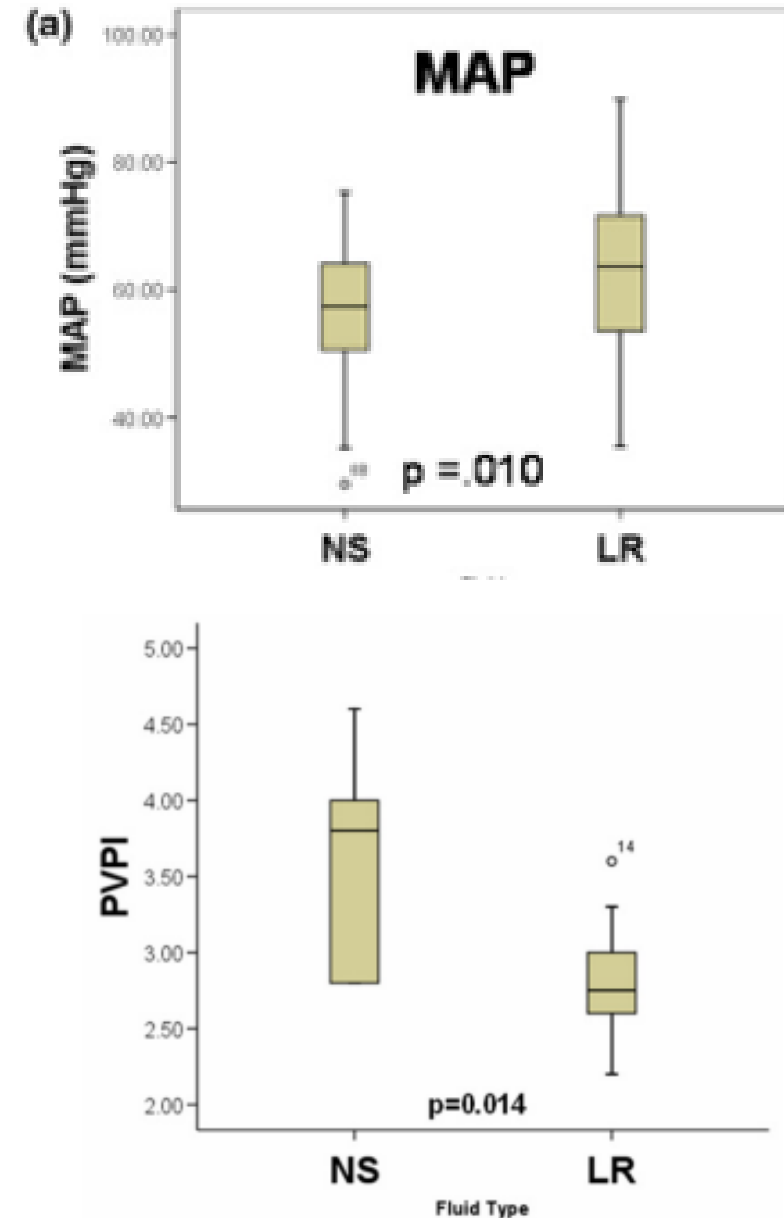
Charles R Phillips¹, Kevin Vinecore¹, Daniel S Hagg¹, Rebecca S Sawai², Jerome A Differding², Jennifer M Watters² and Martin A Schreiber²

Table 1

Laboratory values at study end

	Normal saline	Lactated Ringer's solution	p value
Sodium	137.9 ± 10.8	127.0 ± 8.2	0.432
Potassium	3.5 ± 0.2	4.1 ± 0.06	0.010
Calcium	1.22 ± 0.06	1.34 ± 0.01	0.039
Lactate	1.3 ± 0.3	6.0 ± 0.7	< 0.001
Bicarbonate	16.7 ± 1.7	27.8 ± 0.9	< 0.001
Partial pressure of arterial carbon dioxide	44.7 ± 3.0	43.3 ± 0.6	0.647
pH	7.17 ± 0.03	7.41 ± 0.02	< 0.001
Haemoglobin	4.7 ± 0.39	5.9 ± 0.35	0.039
Haematocrit	12.7 ± 1.1	16.56 ± 1.2	0.028

Results are reported as means ± standard error of the mean. Animals resuscitated with normal saline were more acidaemic (despite having lower lactates), were more anaemic and had lower serum calcium and potassium levels.

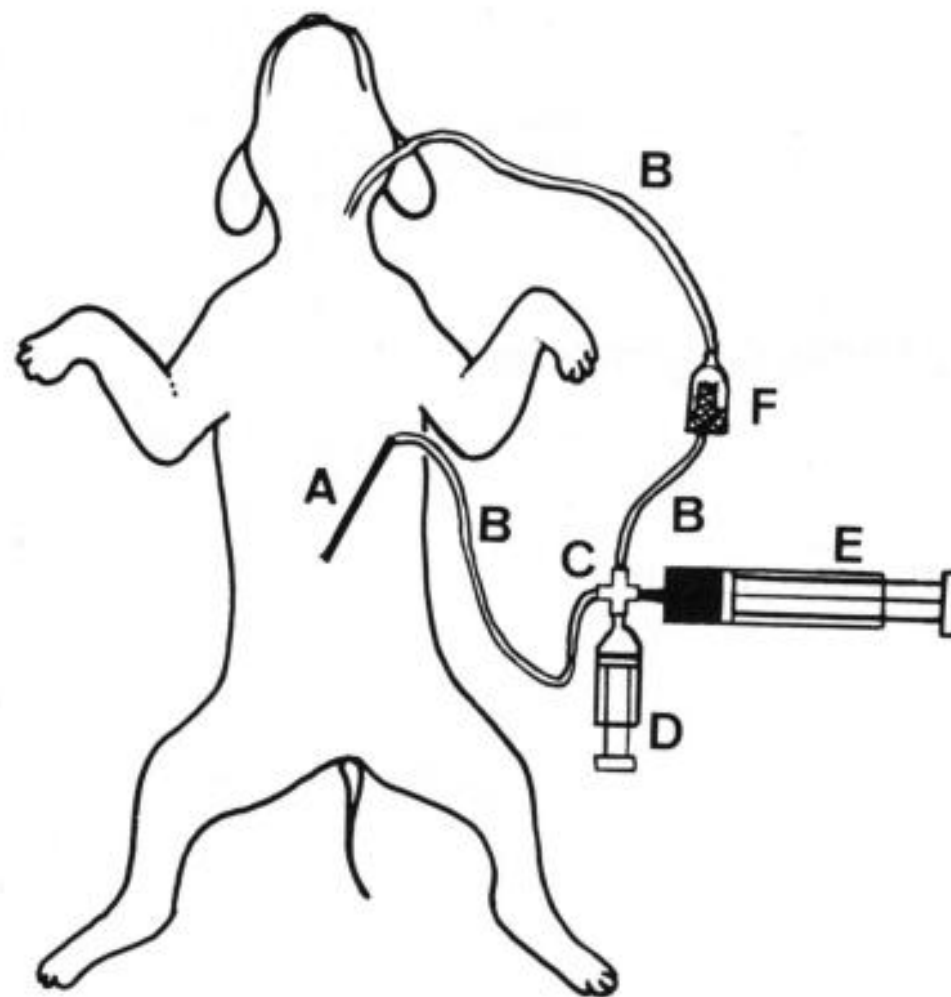


TRANSFUSION MEDICINE

0195-5616/95 \$0.00 + .20

AUTOTRANSFUSION IN THE EMERGENCY PATIENT

Deanna Purvis, VMD





Original Article

Twelve autologous blood transfusions in eight cats with haemoperitoneum

Laura P Cole^{id} and Karen Humm

Journal of Feline Medicine and Surgery
1–7

© The Author(s) 2018

Reprints and permissions:

sagepub.co.uk/journalsPermissions.nav

DOI: 10.1177/1098612X18785742

journals.sagepub.com/home/jfm

This paper was handled and processed
by the European Editorial Office (ISFM)
for publication in *JFMS*



Results Between July 2012 and March 2018 a total of 12 autotransfusions were performed in eight cats. All patients were diagnosed with haemoperitoneum. Four of the eight cats were diagnosed with abdominal neoplasia, three had postoperative haemorrhage and one had a traumatic haemoperitoneum. Three cats received more than one autotransfusion. Blood was collected using a 23 G butterfly catheter and 20 ml syringe in 7/12 collections, a 23 G needle and 20 ml syringe in 2/12 collections and directly into syringes from the open abdomen at the time of surgery in 3/12 collections. A median volume of 50 ml (range 25–80 ml) was collected and administered, meaning a median volume of 16.5 ml/kg (range 9–26 ml/kg) was administered. The autologous transfusions were given over a median of 3 h (0.25–6 h). Five cats were given another blood product alongside the autotransfusion. Median percentage PCV increase was 5% (range 1–7%). Anticoagulant was used in 5/12 autotransfusions. No clinically relevant adverse effects were reported. Six of the eight cats survived to discharge. Two month survival was 60% (3/5).

Blood salvage and cancer surgery: should we do it?

Jonathan H. Waters and

Department of Anesthesiology, Magee-Womens Hospital, University of Pittsburgh Medical Center

Albert D. Donnenberg

Hillman Cancer Research Center, University of Pittsburgh School of Medicine, Pittsburgh, PA

Jonathan H. Waters: watejh@upmc.edu

**Blood Cell Salvage and Autotransfusion
Does Not Worsen Oncologic Outcomes
Following Liver Transplantation with
Incidental Hepatocellular Carcinoma: A
Propensity Score-Matched Analysis**



socrative

by MasteryConnect

A PRACTICAL APPROACH TO HEMOPERITONEUM IN THE DOG AND CAT

Daniel J. Brockman, BVSc, CVR, CSAO, Carlos M. Mongil, DVM,
Lillian R. Aronson, VMD, and Dorothy Cimino Brown, DVM

- It is thus possible to justify recommending exploratory surgery for **all** patients regardless of tumor "staging" status. This recommendation is made on the grounds of securing a tissue diagnosis and arresting ongoing hemorrhage even if the long-term therapeutic benefit of surgery is unclear.

Hemoabdomen espontáneo

VETERINARY CLINICS OF NORTH AMERICA: SMALL ANIMAL PRACTICE

VOLUME 30 • NUMBER 3 • MAY 2000

657

A PRACTICAL APPROACH TO HEMOPERITONEUM IN THE DOG AND CAT

Daniel J. Brockman, BVSc, CVR, CSAO, Carlos M. Mongil, DVM,
Lillian R. Aronson, VMD, and Dorothy Cimino Brown, DVM

Surgery: When and How

The veterinary literature supports emergency exploratory laparotomy for penetrating abdominal trauma,² massive hemoperitoneum with hemodynamic instability,²² and in situations where a breakdown in surgical hemostasis is suspected. In this instance, instability is defined as a failure to achieve stability with rational emergency measures (i.e., fluid therapy, including blood transfusion, and abdominal pressure bandaging). Nonoperative treatment is the usual course for animals that are, or become, hemodynamically stable and have no signs of other organ involvement (e.g., urinary tract, biliary tract). The final decision is made based on estimated risk:benefit ratios for the patient and cost:benefit ratios for the client. In veterinary medicine, such calculations are mostly experience-influenced guesses.

Recordar: Si presenta hipotensión perdió mucha sangre

TABLE 2 | Signs and symptoms of hemorrhage by class as defined in the American college of surgeons advanced trauma life support 10th edition manual.

Parameter	Class I	Class II (mild)	Class III (moderate)	Class IV (severe)
Approximate blood loss	<15%	15–30%	31–40%	>40%
Heart rate	↔	↔ / ↑	↑	↑ / ↑↑
Blood pressure	↔	↔	↔ / ↓	↓
Pulse pressure	↔	↓	↓	↓
Respiratory rate	↔	↔	↔ / ↑	↑
Urine output	↔	↔	↓	↓↓
Glasgow Coma Scale score	↔	↔	↓	↓
Base deficit*	0 to –2 mEq/L	–2 to –6 mEq/L	–6 to –10 mEq/L	–10 mEq/L or less
Need for blood products	Monitor	Possible	Yes	Massive transfusion protocol

TABLA 3-2 RESPUESTA INICIAL A LA REANIMACIÓN CON LÍQUIDOS ^a

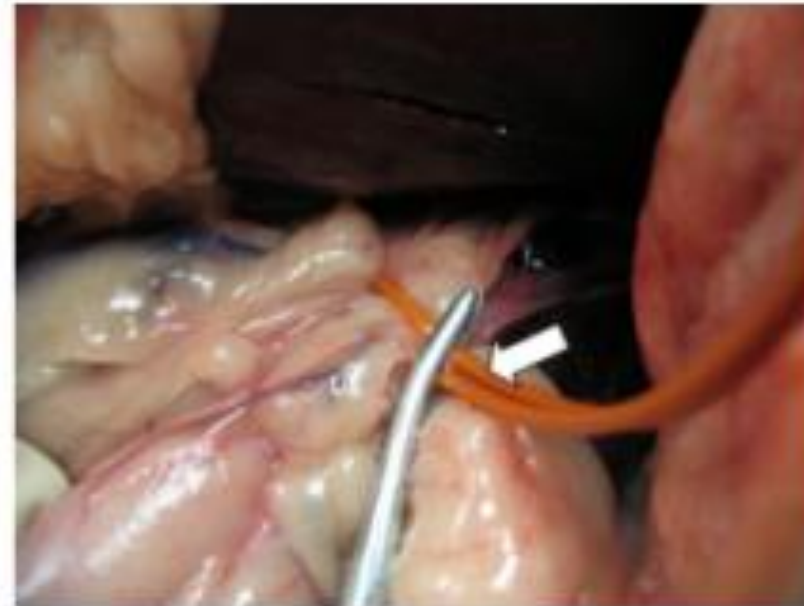
	RESPUESTA RÁPIDA	RESPUESTA TRANSITORIA	MÍNIMA O NINGUNA RESPUESTA
Signos vitales	Regreso a la normalidad	Mejoría temporal, recurrencia de disminución de la presión arterial y aumento de la frecuencia cardíaca	Permanece anormal
Pérdida sanguínea estimada	Mínima (<15 %)	Moderada y persistente (15%–40%)	Grave (>40%)
Requisito de transfusión sanguínea	Bajo	Moderado a alto	Inmediato
Preparación de la sangre	Tipo y pruebas cruzadas	Tipo - específica	Entrega de emergencia
Necesidad de intervención quirúrgica	Posible	Probable	Muy probable
Evaluación temprana por cirujano	Sí	Sí	Sí

^a Solución cristalóide isotónica, hasta 1000 mL en adultos; 20 mL/kg en niños



Clinical evaluation and management of hemoperitoneum in dogs

Lee V. Herold, DVM, DACVECC, Jennifer J. Devey, DVM, DACVECC, Rebecca Kirby, DVM, DACVIM, DACVECC and Elke Rudloff, DVM, DACVECC





DOI: 10.1111/vec.12873

CASE SERIES

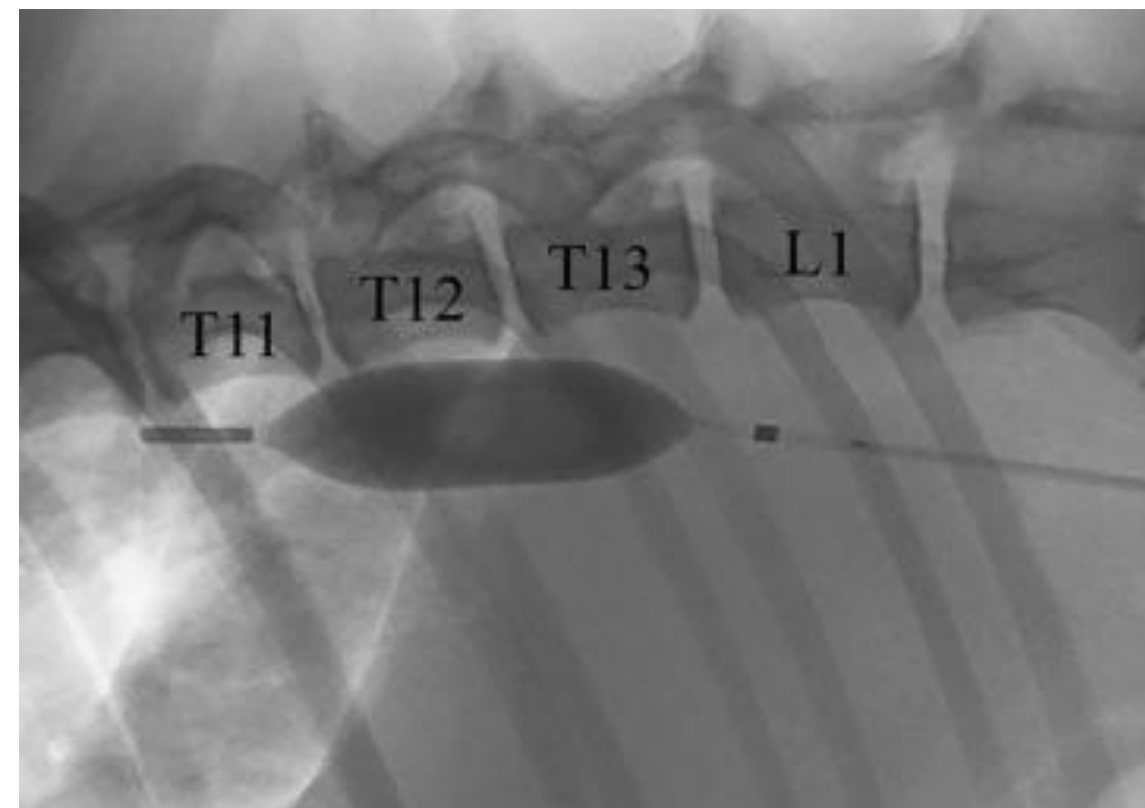
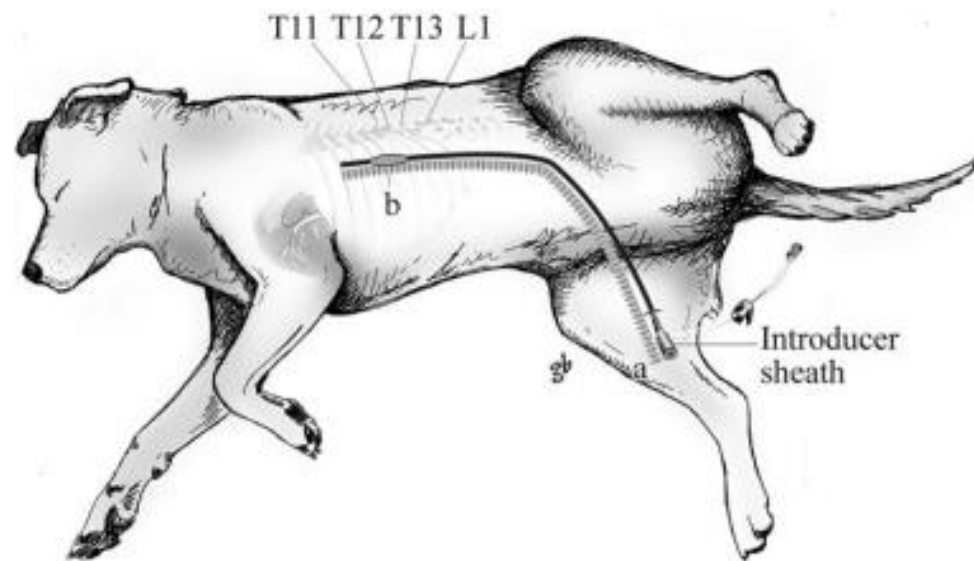


Temporary abdominal packing for management of persistent hemorrhage after liver lobectomy in three dogs with hepatic neoplasia

Natashia A. Evans BSc(hons), BSc(Vet), MVetClinStudies, DACVECC | Robert J. Hardie DVM, DACVS, DECVS  | Julie Walker DVM, DACVECC | Jonathan Bach DVM, DACVIM, DACVECC 



FIGURE 3 Intraoperative image of the abdominal packing being removed in dog 3, 36 hours after having undergone temporary abdominal packing for management of persistent hemorrhage following liver lobectomy



Received: 9 May 2018 | Revised: 2 November 2018 | Accepted: 23 November 2018
 DOI: 10.1111/vsu.13145



WILEY

ORIGINAL ARTICLE

Placement of a balloon for resuscitative endovascular balloon occlusion of the aorta without fluoroscopic guidance in canine cadavers

Jennifer Marie Loewen DVM¹ | Lauren Melissa Blume BVSc² |
 Jonathan Francis Bach DVM, DACVIM, DACVECC¹

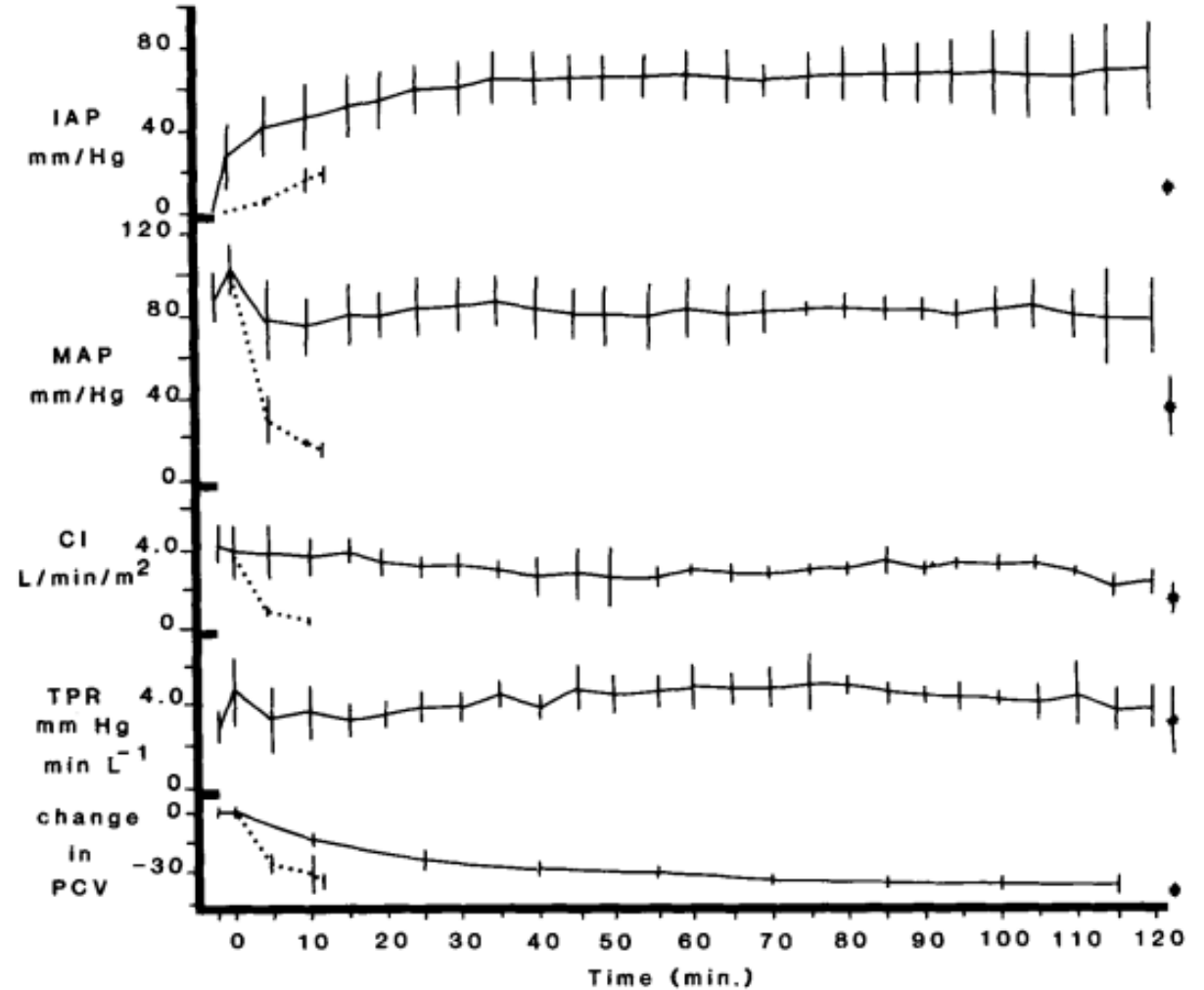
The reported location of the celiac artery is at the first lumbar vertebra.

Circumferential External Counterpressure by Abdominal Wrapping and Its Effect on Simulated Intra-abdominal Hemorrhage

J. F. McANULTY, DVM, and G. K. SMITH, VMD, PhD

Intra-abdominal hemorrhage was simulated by abdominal aortic cannulation through the femoral artery with shunting of blood into the peritoneal cavity via a transabdominal Foley catheter

2 hours of counterpressure



Computed tomographic features of intra-abdominal hypertension in three dogs

Min Jang DVM, PhD^{1,2*} | Sooyoung Choi DVM, PhD^{2,3*} | In Lee DVM, PhD^{1,2} |
Inhyung Lee DVM, PhD¹ 



FIGURE 1 Postcontrast CT images for a dog (Case 1) with IAP of 26 mm Hg, indicating severe IAH. Transverse images (A–C) show a large liver mass (long arrow) with a cavitated lesion (asterisk), renal compression (short arrow), and fluid accumulation (arrowhead) surrounding the left spermatic cord and testis. Elevation of the diaphragm (black arrow) and a dilated caudal epigastric vein (blank arrow) are observed on the dorsal (D) and volume rendering (E) images

Changes in Visceral Blood Flow with Elevated Intraabdominal Pressure

CHRISTOPHER B. CALDWELL, M.D., AND JOHN J. RICOTTA, M.D.

Department of Surgery, University of Rochester School of Medicine and Dentistry, Rochester, New York 10021

Presented at the Annual Meeting of the Association for Academic Surgery, Washington, D.C., November 5-8, 1986

ORGAN BLOOD FLOW AND INTRAABDOMINAL PRESSURE

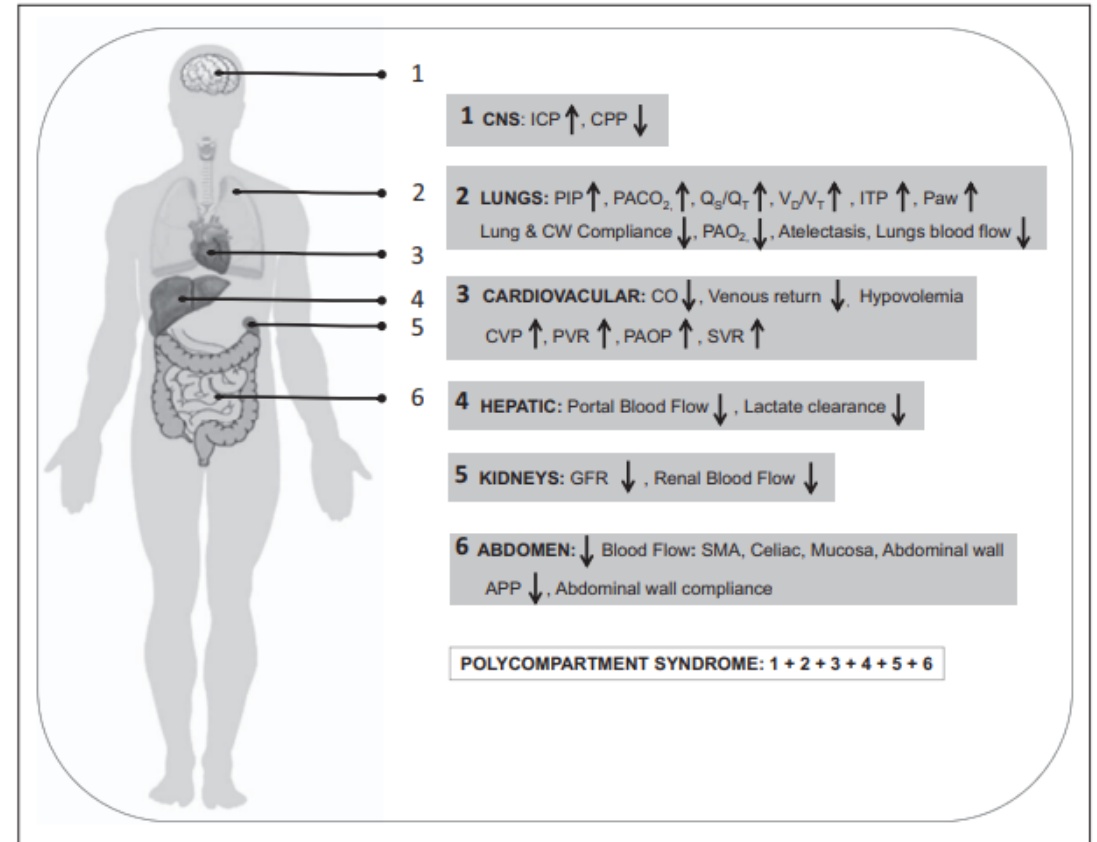
Organ	IAP (mm Hg)		
	0	20	40
Organ blood flow (cc/g/min)			
Omentum	0.43 ± 0.15	0.24 ± 0.05	$0.10 \pm 0.02^{**}$
Esophagus	0.11 ± 0.01	$0.06 \pm 0.01^{**}$	$0.04 \pm 0.01^{**}$
Stomach	0.41 ± 0.07	$0.27 \pm 0.05^{*}$	$0.11 \pm 0.01^{**}$
Gastric mucosa	0.63 ± 0.10	$0.28 \pm 0.04^{**}$	$0.14 \pm 0.03^{**}$
Duodenum	1.19 ± 0.16	$0.71 \pm 0.08^{**}$	$0.55 \pm 0.09^{**}$
Jejunum	1.18 ± 0.13	$0.67 \pm 0.07^{**}$	$0.41 \pm 0.06^{**}$
Ileum	0.66 ± 0.12	$0.32 \pm 0.05^{**}$	$0.27 \pm 0.07^{**}$
Colon	0.63 ± 0.17	$0.36 \pm 0.09^{**}$	$0.26 \pm 0.07^{**}$
Pancreas	0.43 ± 0.08	$0.28 \pm 0.06^{**}$	$0.15 \pm 0.03^{**}$
Gall bladder	0.35 ± 0.07	0.28 ± 0.04	$0.17 \pm 0.03^{**}$
Liver	0.42 ± 0.09	$0.25 \pm 0.10^{*}$	$0.15 \pm 0.06^{**}$
Spleen	2.25 ± 0.51	$1.23 \pm 0.27^{*}$	$0.69 \pm 0.08^{**}$

REVIEW



Abdominal compartment syndrome and intra-abdominal hypertension

Bruno M. Pereira^{a,b,c,d,e}





socrative

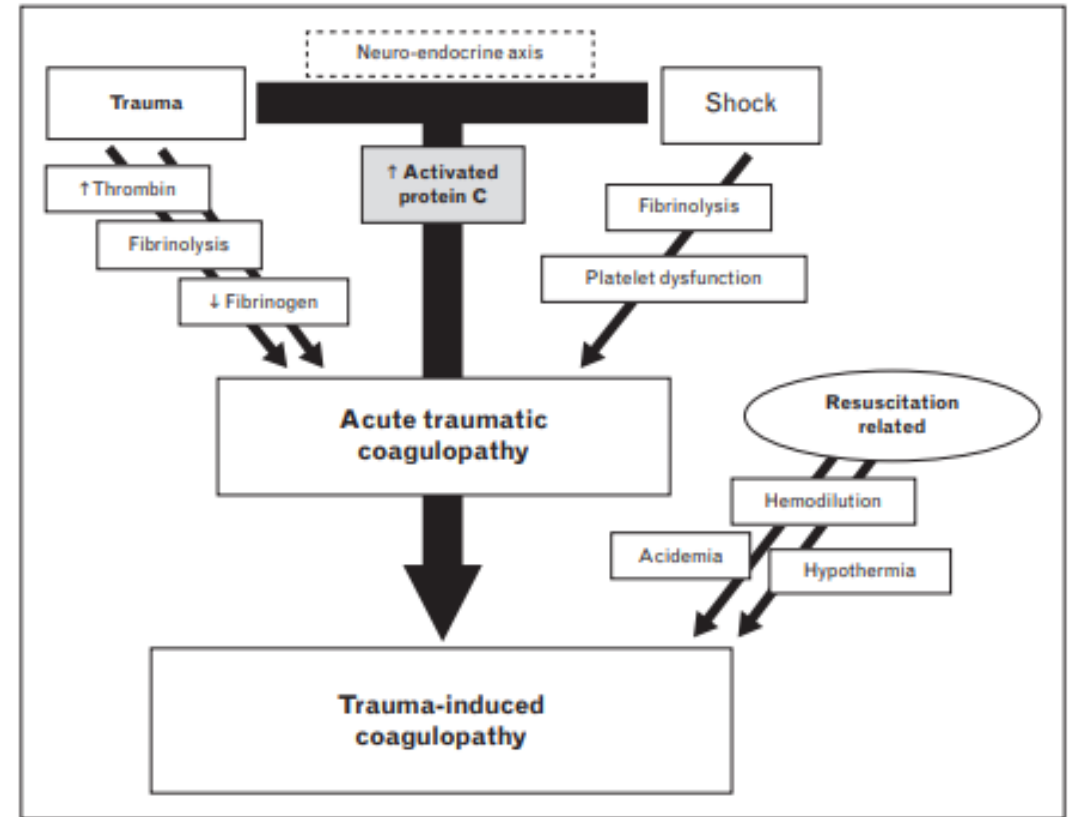
by MasteryConnect

REVIEW



Cause of trauma-induced coagulopathy

Ross A. Davenport and Karim Brohi

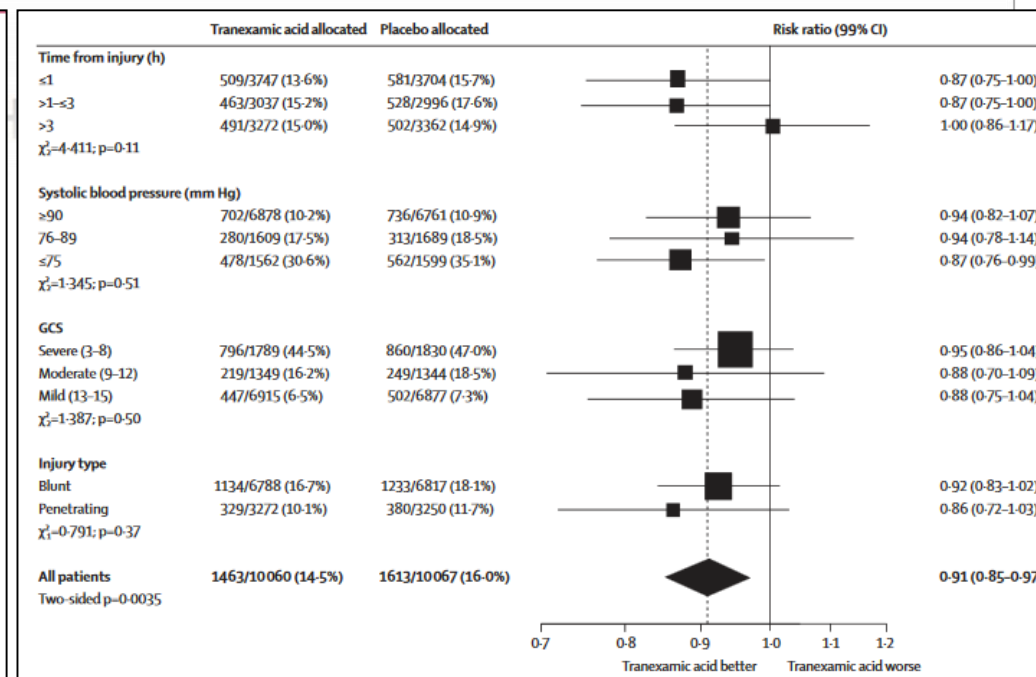
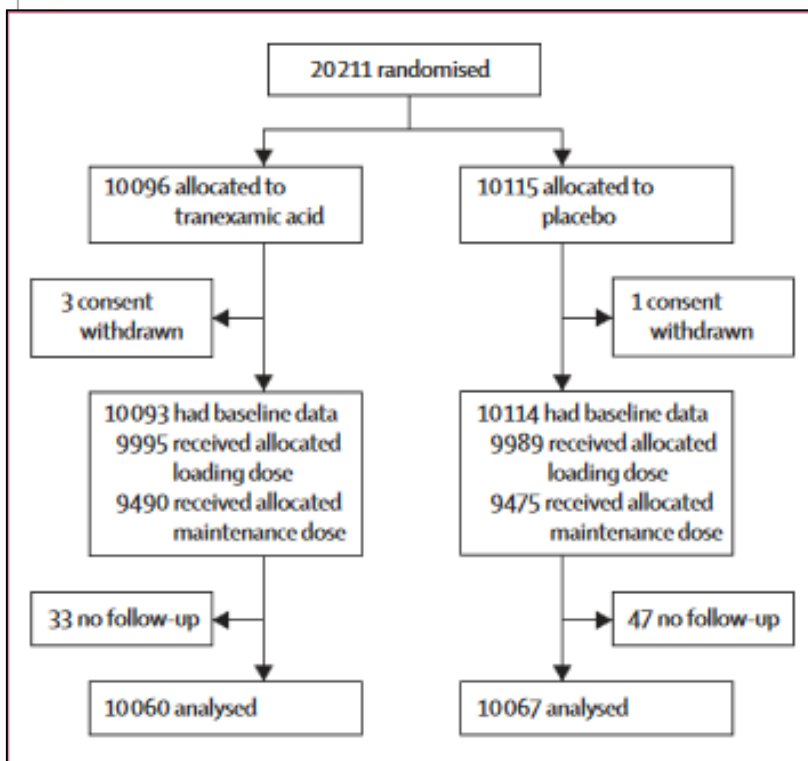


Effects of tranexamic acid on death, vascular occlusive events, and blood transfusion in trauma patients with significant haemorrhage (CRASH-2): a randomised, placebo-controlled trial



CRASH-2 trial collaborators*

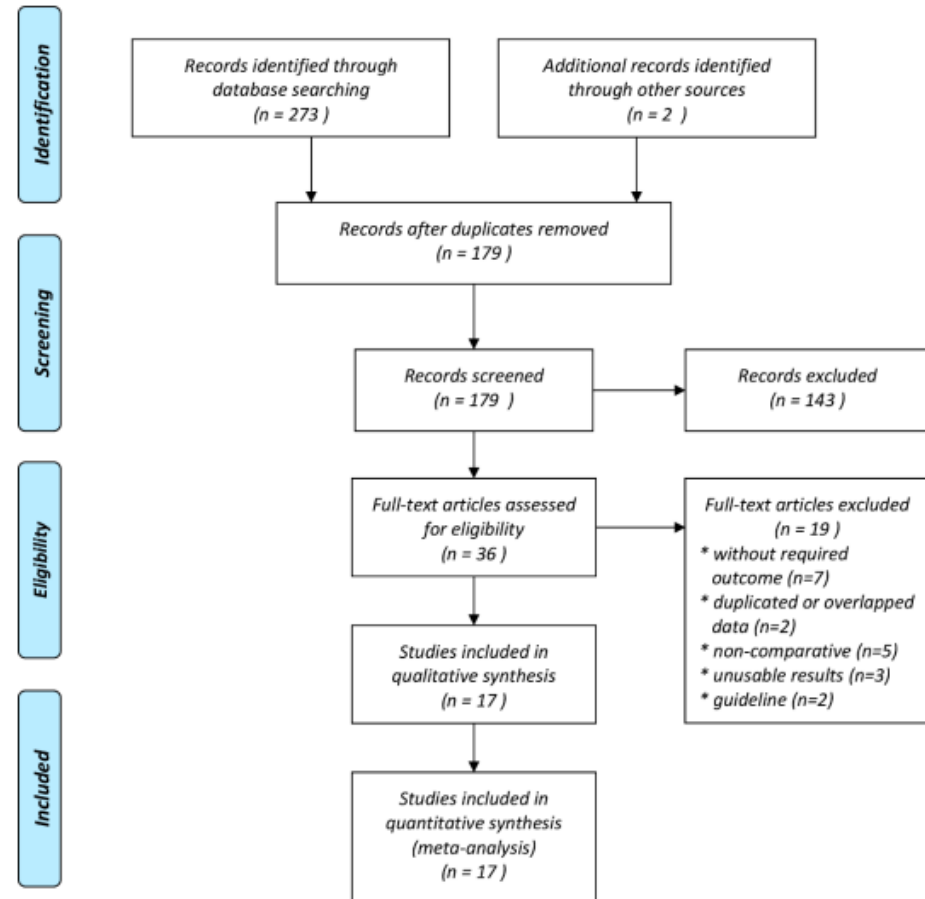
CRASH-2 trial collaborators*

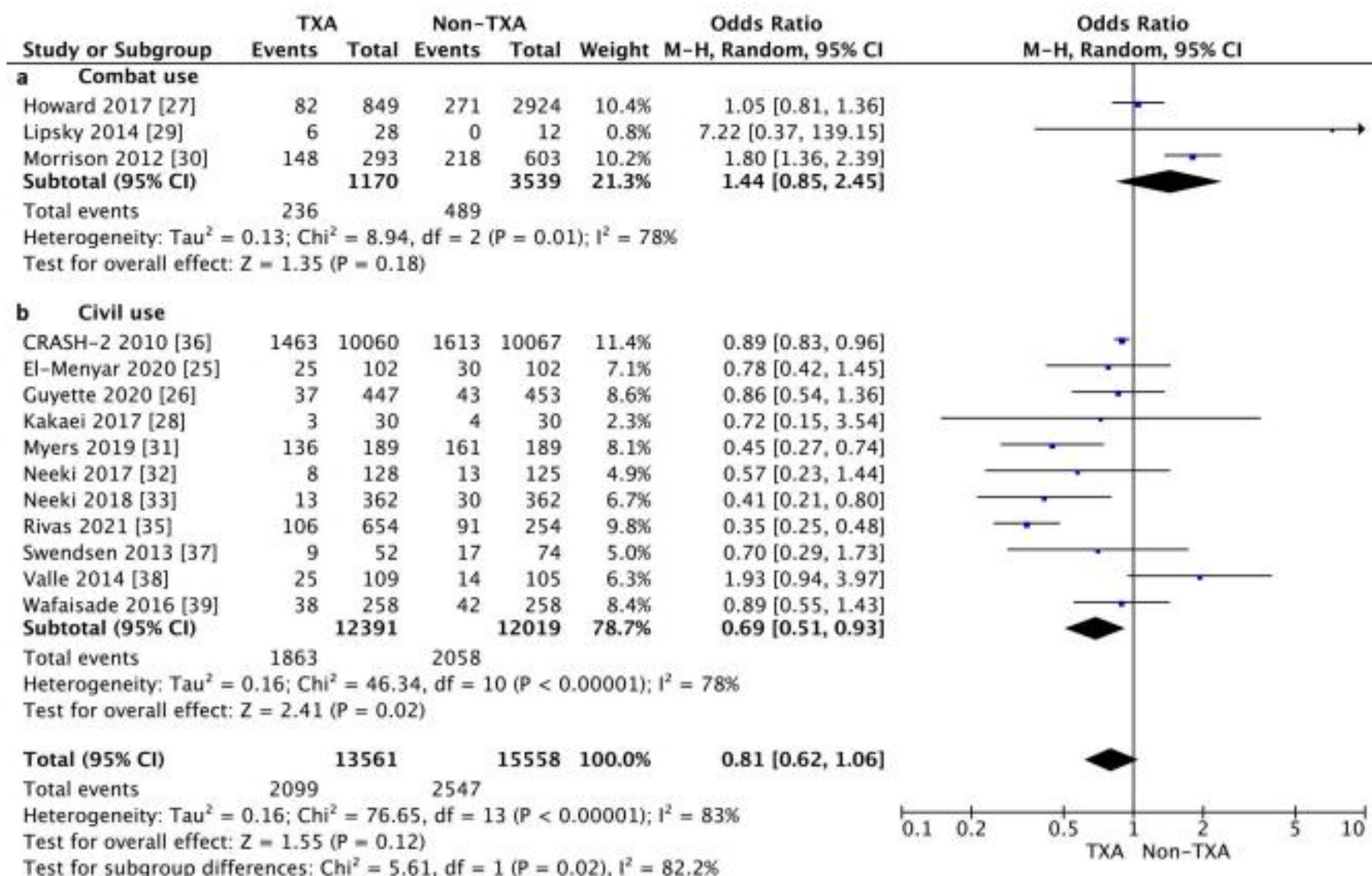


Article

Efficacy and Safety of Tranexamic Acid in Emergency Trauma: A Systematic Review and Meta-Analysis

Mahdi Al-Jeabory ¹, Lukasz Szarpak ^{2,*} , Kecskes Attila ³, Michael Simpson ⁴, Adam Smereka ⁵, Aleksandra Gasecka ^{6,7} , Wojciech Wieczorek ⁸, Michal Pruc ¹, Maciej Koselak ⁹, Wladyslaw Gawel ¹⁰, Igor Checinski ¹¹, Milosz J. Jaguszewski ¹² and Krzysztof J. Filipiak ⁶



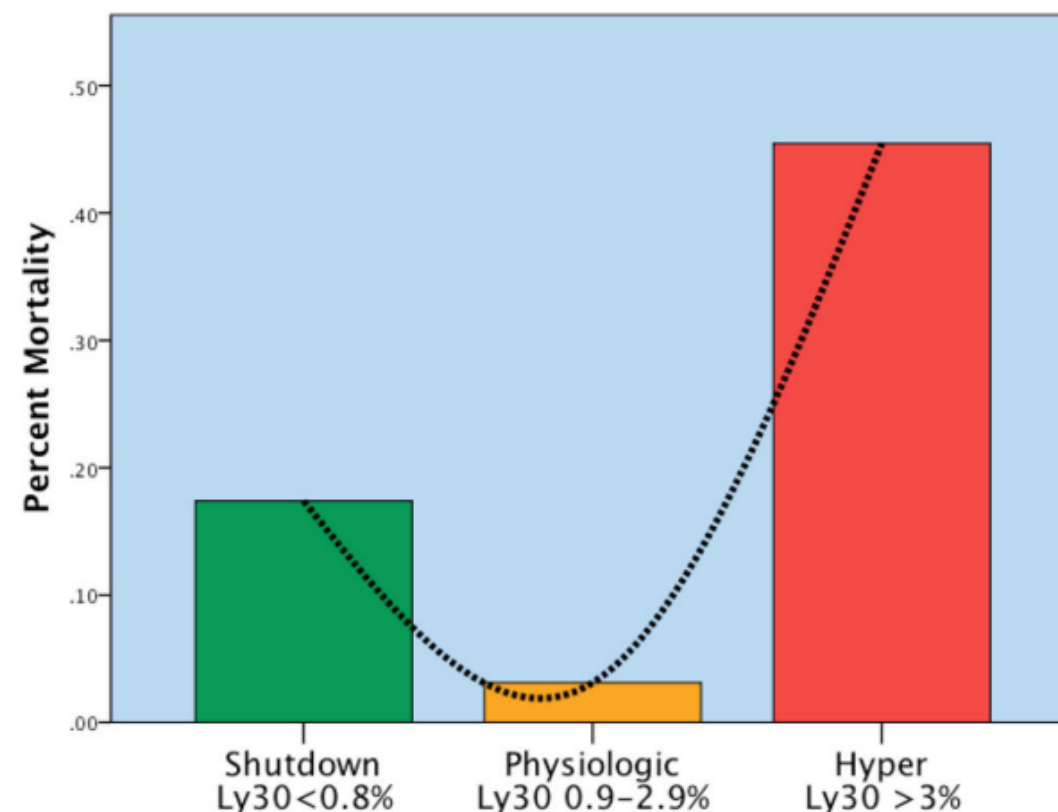


Postinjury Fibrinolysis Shutdown: Rationale for Selective Tranexamic Acid

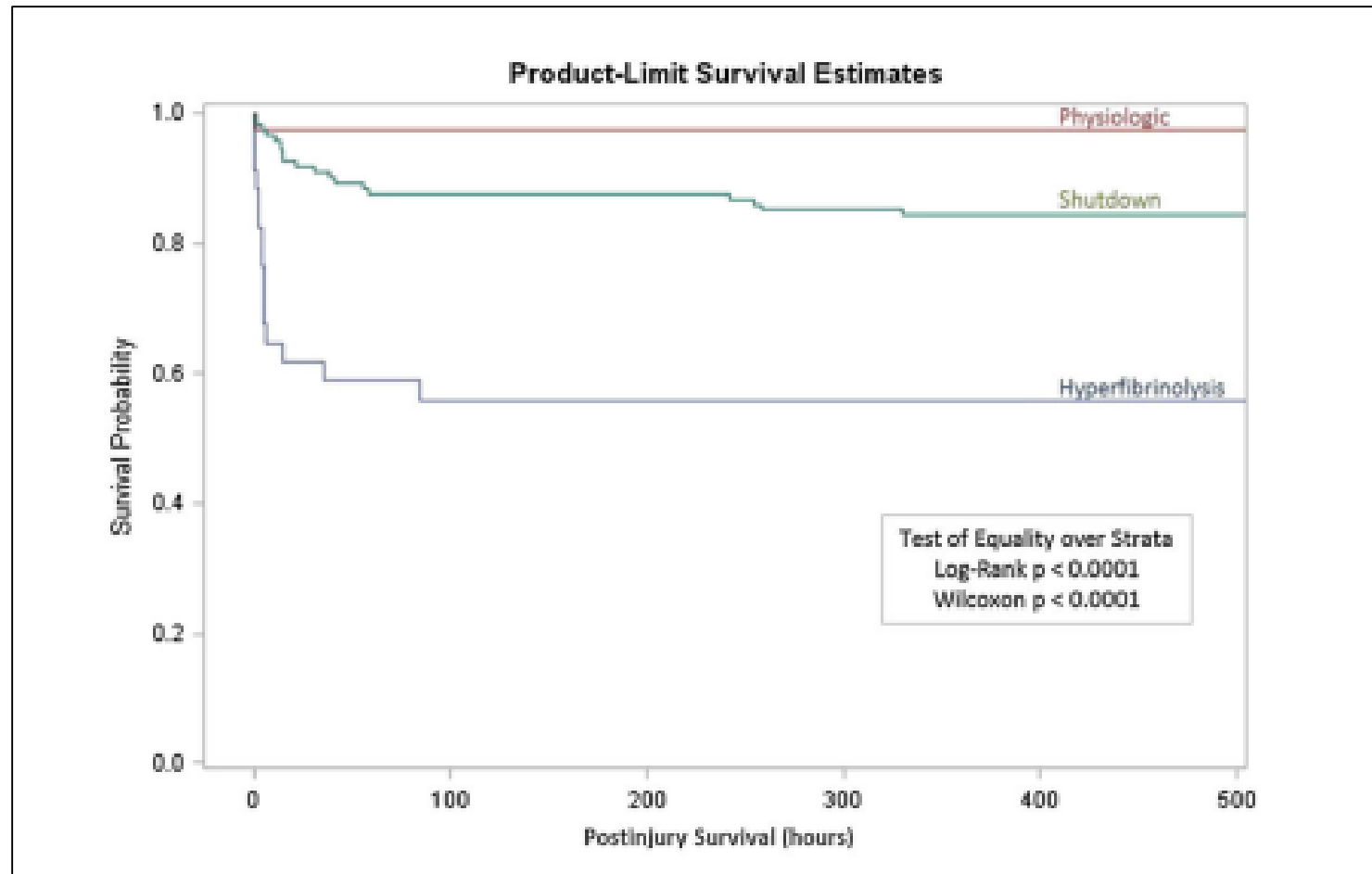
Ernest E. Moore, M.D.^{(1),(3)}, Hunter B. Moore, M.D.^{(1),(3)}, Eduardo Gonzalez, M.D.^{(1),(3)}, Michael P. Chapman, M.D.^{(1),(3)}, Kirk C. Hansen, Ph.D.⁽¹⁾, Angela Sauaia, M.D., Ph.D.^{(1),(3)}, Christopher C. Silliman, M.D., Ph.D.^{(2),(4)}, and Anirban Banerjee, Ph.D.⁽¹⁾

We define shutdown as a relative resistance to tPA, due to a physiologic dysregulation of the plasminogen-plasmin system.

Fibrinolysis shutdown (as defined above) was the most common phenotype, accounting for 64% (n=115) with physiologic fibrinolysis (n=32) and hyperfibrinolysis (n=33) representing 18% each.



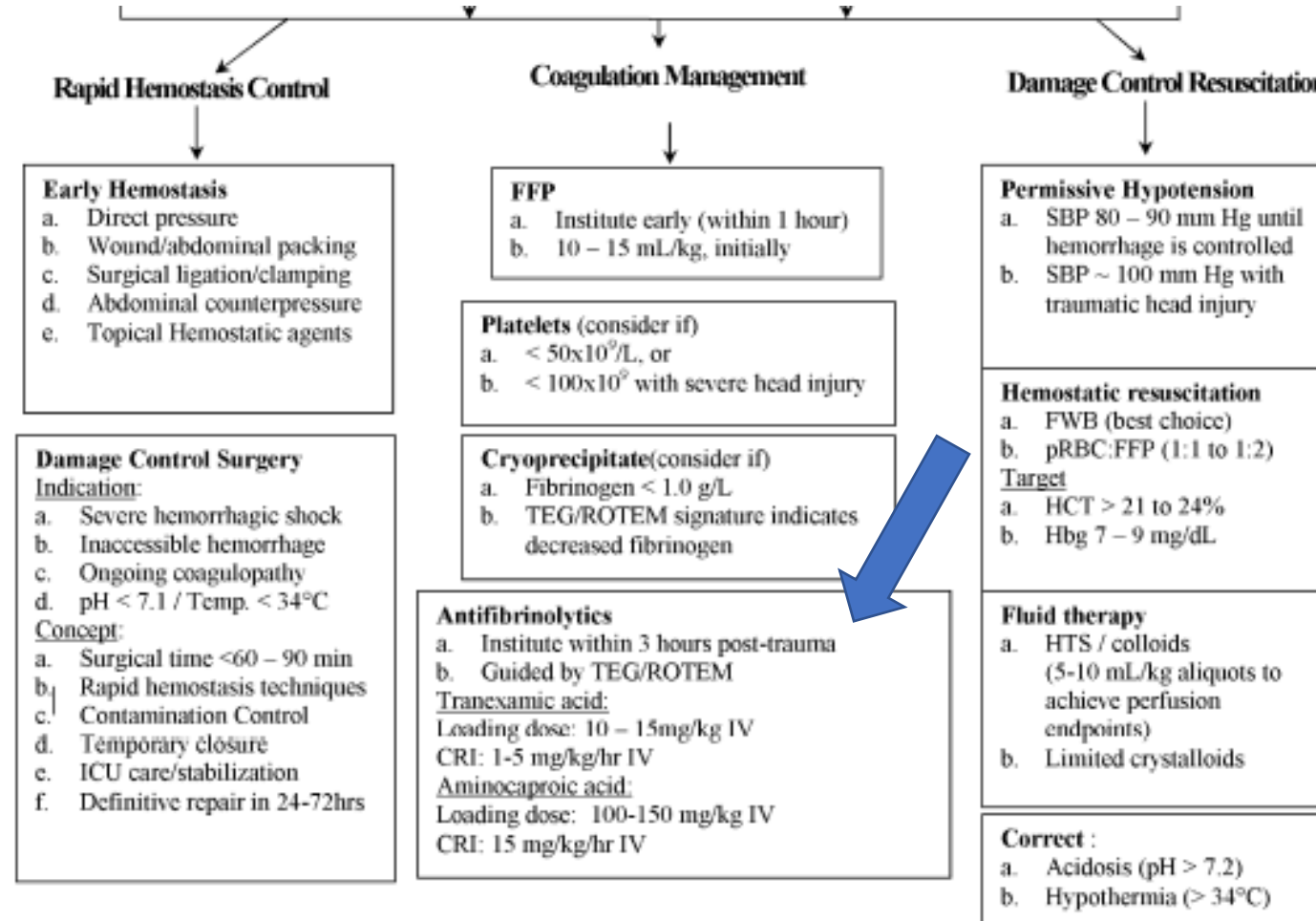
Interestingly in both our rodent and swine models, shock (ischemia/reperfusion) produced consistent systemic hyperfibrinolysis; whereas, tissue injury (thoracotomy/laparotomy/femur fracture) provoked physiologic fibrinolysis shutdown (25).





Traumatic coagulopathy-Part 2: Resuscitative strategies

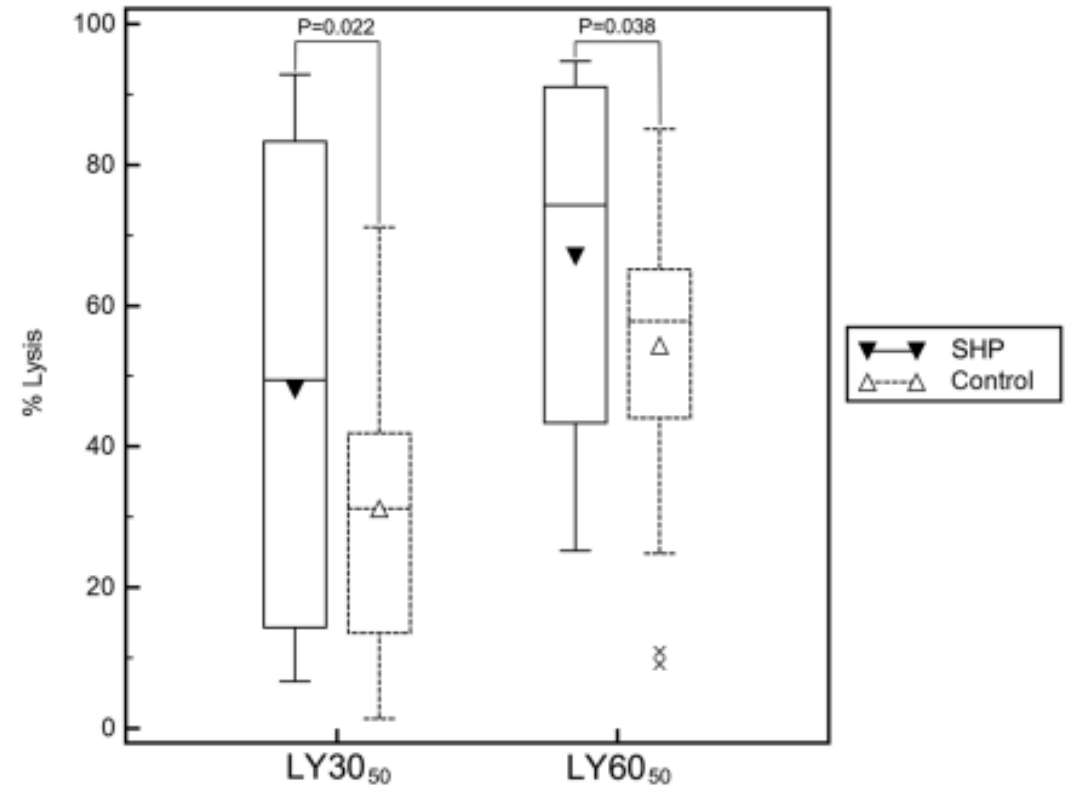
Lee Palmer, DVM, DACVECC and Linda Martin, DVM, MS, DACVECC





Assessment of the relationships among coagulopathy, hyperfibrinolysis, plasma lactate, and protein C in dogs with spontaneous hemoperitoneum

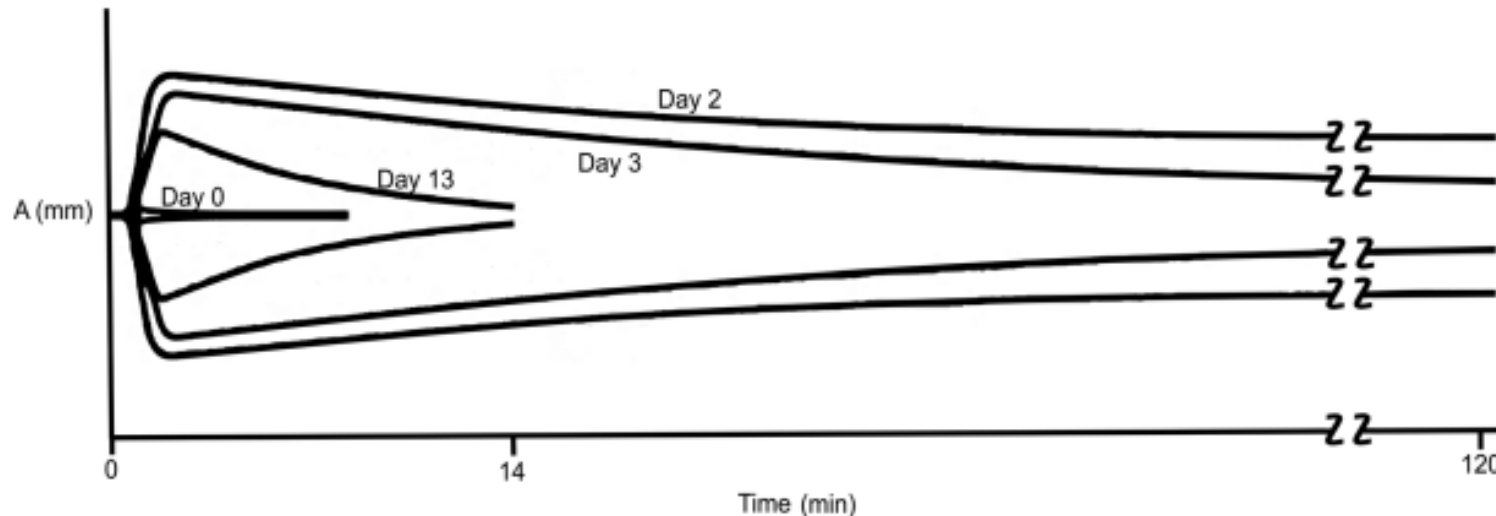
Daniel J. Fletcher, PhD, DVM, DACVECC; Elizabeth A. Rozanski, DVM, DACVIM, DACVECC; Benjamin M. Brainard, VMD, DACVA, DACVECC; Armelle M. de Laforcade, DVM, DACVECC and Marjory B. Brooks, DVM, DACVIM





Thromboelastographic evidence of inhibition of fibrinolysis after ϵ -aminocaproic acid administration in a dog with suspected acute traumatic coagulopathy

Seung H. Yoo, MS, MBA, DVM; Emilee Venn, DVM; Lauren A. Sullivan, DVM, MS, DACVECC and Christine S. Olver, DVM, PhD, DACVP



Shock y sangrado grave grave luego de accidente de tránsito

EACAe was started (33 mg/kg IV q 6 h) approximately 2 hours after surgery
extremely rapid Clot lysis TEG
Both MRL and CLT indicate increased fibrinolysis compared to days 2 and 3, suggesting a return to normal fibrinolysis.

Acido TXA
para todxs!!





Hypoperfusion and acute traumatic coagulopathy in severely traumatized canine patients

Amanda L. Abelson, DVM, DACVECC; Therese E. O'Toole, DVM, DACVIM, DACVECC; Andrea Johnston, DVM; Meghan Respass, DVM and Armelle M. de Laforcade, DVM, DACVECC

Case selection

All canine patients presenting to the ED following trauma were considered for inclusion in the study. Patients were deemed eligible for the study if the following criteria were met: a body weight >5 kg, the patient had received no IV fluids nor blood products prior to presentation, the patient had an ATT ≥ 5 , and the traumatic event had occurred within the previous 4 hours. The ATT was calculated as described previously.^{14,15}

Nine of 30 (30%) dogs had evidence of hemorrhage noted either by direct physical examination or via focused assessment with sonography for trauma of both the abdominal and thoracic cavities

Table 1: Results of TEG values in 30 dogs following severe trauma

Parameter	Median	Range	Reference	Hyper	Normo	Hypo
R (min)	3.6	1.5–5.9	3–9	7	23	0
k (min)	1.9	1–5.1	2–8	15	15	0
a (deg)	63.8	41.3–78.1	28–59	19	11	0
Maximum amplitude (mm)	54.5	43.5–68	39–59	9	21	0
G (dyn/cm ²)	6,000	3,870–10,600	3,200–7,200	10	20	0

Hyper, hypercoagulable; Normo, normocoagulable; Hypo, hypocoagulable; R, the R time; k, the k time; a, the alpha angle; G, the G value where $G = 5,000 \times MA/(100 MA)$. This table was modified with permission from Sinnot VB, Otto CM. Use of thromboelastography in dogs with immune-mediated hemolytic anemia: 39 cases (2000–2008). *Journal of Veterinary Emergency and Critical Care* 2009; 19(5): 484–488.

Rotational thromboelastometry (ROTEM) parameters in dogs with haemoperitoneum and their associations with clinical and laboratory signs

A. Martin¹, A. P. N. Kutter², N. E. Sigrist¹

¹Division of Critical Care Medicine, Department for Small Animals and ²Section of Anaesthesiology, Department for Clinical Diagnostics and Services, Vetsuisse Faculty University of Zürich

[https://doi.org/
10.17236/sat00249](https://doi.org/10.17236/sat00249)

The main cause of haemoperitoneum was spontaneous bleeding (31/40, 77.5%) due to a splenic (18/31) or hepatic mass (4/31) or other bleeding processes (9/31) such as pathological changes in the adrenal glands (3/9) or ovaries (2/9) and unknown causes of bleeding (4/9). Nine of 40 (22.5%) dogs were identified with traumatic haemoperitoneum. Sixteen of the 40 (40%) dogs received crystalloid fluids (mean: 9 ml/kg, range: 0 – 58 ml/kg) prior to ROTEM analysis.

50% were hypocoagulable and 62% thrombocytopenic. No hyperfibrinolysis could be detected.

Prevalence of Acute Traumatic Coagulopathy in Acutely Traumatized Dogs and Association with Clinical and Laboratory Parameters at Presentation

Yaiza Herrero¹ Rahel Jud Schefer¹ Benjamin M. Muri² Nadja E. Sigrist¹ 

¹ Division of Emergency and Critical Care Medicine, Department of Small Animals, Vetsuisse Faculty of the University of Zurich, Switzerland

² Clinic for Small Animal Surgery, Department of Small Animals, Vetsuisse Faculty of the University of Zurich, Switzerland

Address for correspondence: Nadja Sigrist, Division of Emergency and Critical Care Medicine, Department of Small Animals, Vetsuisse Faculty, University of Zurich, Winterthurerstrasse 258c, CH-8057 Zurich, Switzerland (e-mail: nsigrist@vetclinics.uzh.ch).

Vet Comp Orthop Traumatol

Eleven of 33 dogs presented with acute traumatic coagulopathy and **3** of these additionally showed hyperfibrinolysis

Hyperfibrinolysis does not seem to be the main initiator of acute traumatic coagulopathy in dogs which is in accordance with recent findings in cats

Hypofibrinogenemia and increased fibrinogen turnover are now believed to be one of the main causes for acute traumatic coagulopathy and therefore have become target points for resuscitation.

Serial Evaluation of Haemostasis Following Acute Trauma Using Rotational Thromboelastometry in Cats

Benjamin M. Muri¹ Rahel Jud Schefer¹ Nadja E. Sigrist¹ 

Results The incidence of ATC was 15% and the most common ROTEM abnormalities in cats with ATC were clotting time and CFT prolongation in both extrinsic and intrinsic ROTEM profiles. After 24 hours, compared with presentation, significantly more cats were hypercoagulable ($p = 0.047$) and none of the cats showed hypocoagulopathy. Cats with ATC received significantly more blood transfusions ($p = 0.008$).

Table 2 Changes in coagulation status and platelet count over time in cats with acute trauma

Time point	At presentation	6 h	24 h
Parameter	n/N	n/N	n/N
Hypocoagulable/ATC	4/26	1/7	0/13
Normocoagulable	16/26	4/7	6/13
Hypercoagulable	6/26	2/7	7/13
Hyperfibrinolysis (ML _{EXT} EM > 10%)	1/26	0/7	0/13
Thrombocytopenia (<150 10 × 3/uL)	8/22	NA	2/8
Hypofibrinogenemia (MCF _{FIB} TEM < 2 mm)	1/26	1/7	0/13

Abbreviations: ATC, acute traumatic coagulopathy; NA, not assessed.

Hyperfibrinolysis diagnosed with rotational thromboelastometry and treated with tranexamic acid in a dog with acute traumatic coagulopathy

Perro atropellado por un camion

Laceración de la arteria femoral y sangrado grave

Se detectó hiperfibrinólisis y fue tratado con TXA

B. Muri¹, P. Schmierer², A. Schwarz³, N. Sigrist¹

¹Department for Small Animals, ²Clinic of Small Animal Surgery and ³Section of Anesthesiology, Equine Department, Vetsuisse Faculty, University of Zurich, Switzerland

<https://doi.org/10.17236/sat00155>

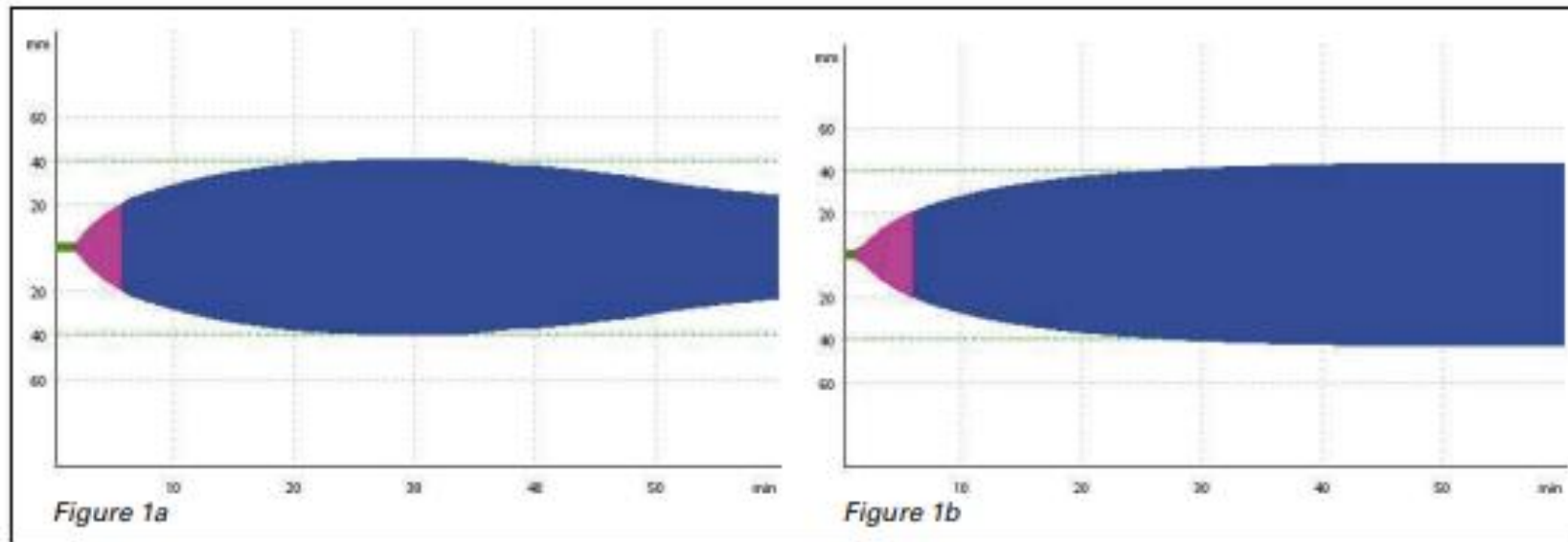


Figure 1: ExTEM (1a) and ApTEM (1b) profile of a dog with acute traumatic coagulopathy after initial therapy. Both profiles show hypocoagulability with a maximum clot firmness of 40 mm in ExTEM. The ExTEM profile shows hyperfibrinolysis, starting after 30 minutes. Lysis cannot be seen in the ApTEM, suggesting the identified lysis in the ExTEM profile represents true hyperfibrinolysis (Ganter, 2008)

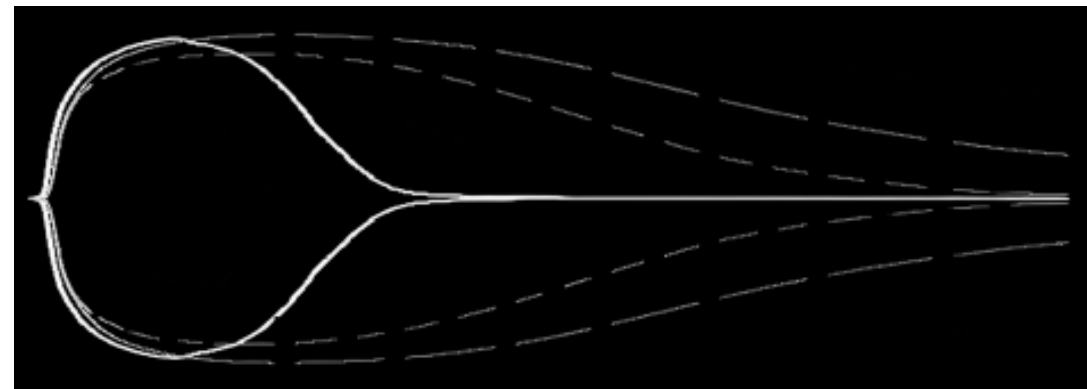
ORIGINAL STUDY



Rapid resolution of hyperfibrinolysis in dogs with spontaneous hemoperitoneum following surgical control of hemorrhage

Ian M. DeStefano DVM, DACVECC¹ | Elizabeth A. Rozanski DVM, DACVIM, DACVECC¹ | Benjamin Koethe MPH² | Armelle M. de Laforcade DVM, DACVECC¹

from healthy dogs ($n = 22$). The point prevalence of HF in all dogs screened was 40% (18/45 dogs), and the mean LY30 at baseline for HF dogs was 48.9% ($\pm 24.2\%$), which was significantly higher than that of control dogs ($4.8\% \pm 7.1\%$, $P < 0.001$) and non-HF dogs ($1.9\% \pm 5.7\%$, $P < 0.001$). In HF dogs, there was a significant decrease in LY30 between baseline and 8 hours ($P < 0.0001$) and between 8 and 16 hours ($P = 0.035$) but no significant change thereafter. LY30 at 8 hours (4%, range: 0%–23.4%) was not statistically different from control dogs (6.5%, range: 1.2%–32.8%, $P = 0.664$) suggesting early resolution of HF in this population. Only 2 of 18 dogs were persistently hyperfibrinolytic at 24 hours. Malignancy was diagnosed in 12 of 18 dogs (66.6%), while a benign etiology occurred in 6 of 18 dogs (33.3%). All HF dogs survived to discharge.





Effect of tranexamic acid on intra- and postoperative haemorrhage in dogs with surgically treated hemoperitoneum

Sigrist, Nadja E ; Olgiati, Laura ; Jud Schefer, Rahel

Table 4: Categorical postoperative parameters of 30 dogs treated with (group TXA) and 25 dogs without (group CTR) tranexamic acid and surgically managed hemoperitoneum.

Parameter		Group CTR (n=25)		Group TXA (n=30)		P-value
		n/N	%	n/N	%	
Splenectomy	yes	23/25	92	21/30	70	0.043
SI at 24h	>1.00	10/17	59	5/25	20	0.012
SI at 48h	>1.00	4/11	36	5/21	24	0.362
Fluid increase presentation - 24h	Yes	1/17	6	1/24	4	0.663
Fluid increase between 24-48h	Yes	0/14	0	0/23	0	NA
Continuous bleeding	Yes	8/20	40	11/28	39	0.597
Transfusion (pRBC, whole blood or plasma)	Yes	9/25	36	17/30	57	0.104
Number of dogs that received Erythrocyte transfusions	Yes	9/25	36	15/30	50	0.221
	Intraoperatively	6/25	24	11/30	37	0.237
	Postop	3/25	12	7/30	23	0.233
Number of dogs that received plasma	Intraoperatively	1/25	4	9/30	30	0.013
	Post op	2/25	8	3/30	10	0.588
Hyperfibrinolysis post op	ML>15%	1/2	50	0/6	0	0.250
Hospital discharge	Yes	22/25	88	28/30	93	0.412

Dogs of the TXA group received a median dose of 20 mg/kg (range, 10-25 mg/kg) tranexamic acid at least 30 minutes prior to surgery and over a median number of 1 day (range, 0.5-2 days) and **1 treatment (range, 1-8).**

Effect of early administration of tranexamic acid on ongoing haemorrhage in dogs with non-surgically treated haemoabdomen

N. E. Sigris¹, L. Langenegger¹, R. Jud Schefer¹, K. Kluge¹, A. P. N. Kutter²

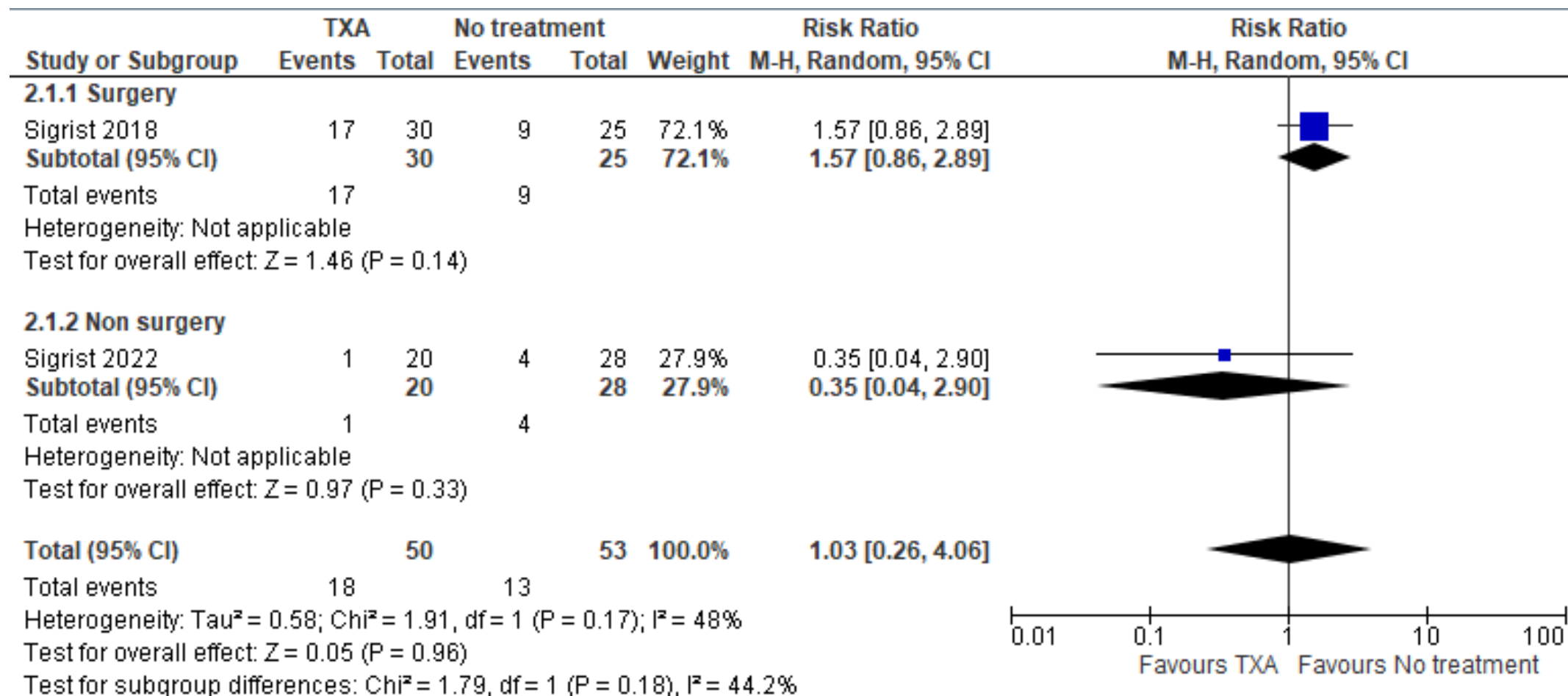
¹Departement für Kleintiere, Abteilung für Notfall- und Intensivmedizin, Vetsuisse Fakultät Universität Zürich;

²Departement für klinische Studien, Abteilung für Anästhesie, Vetsuisse Fakultät Universität Zürich

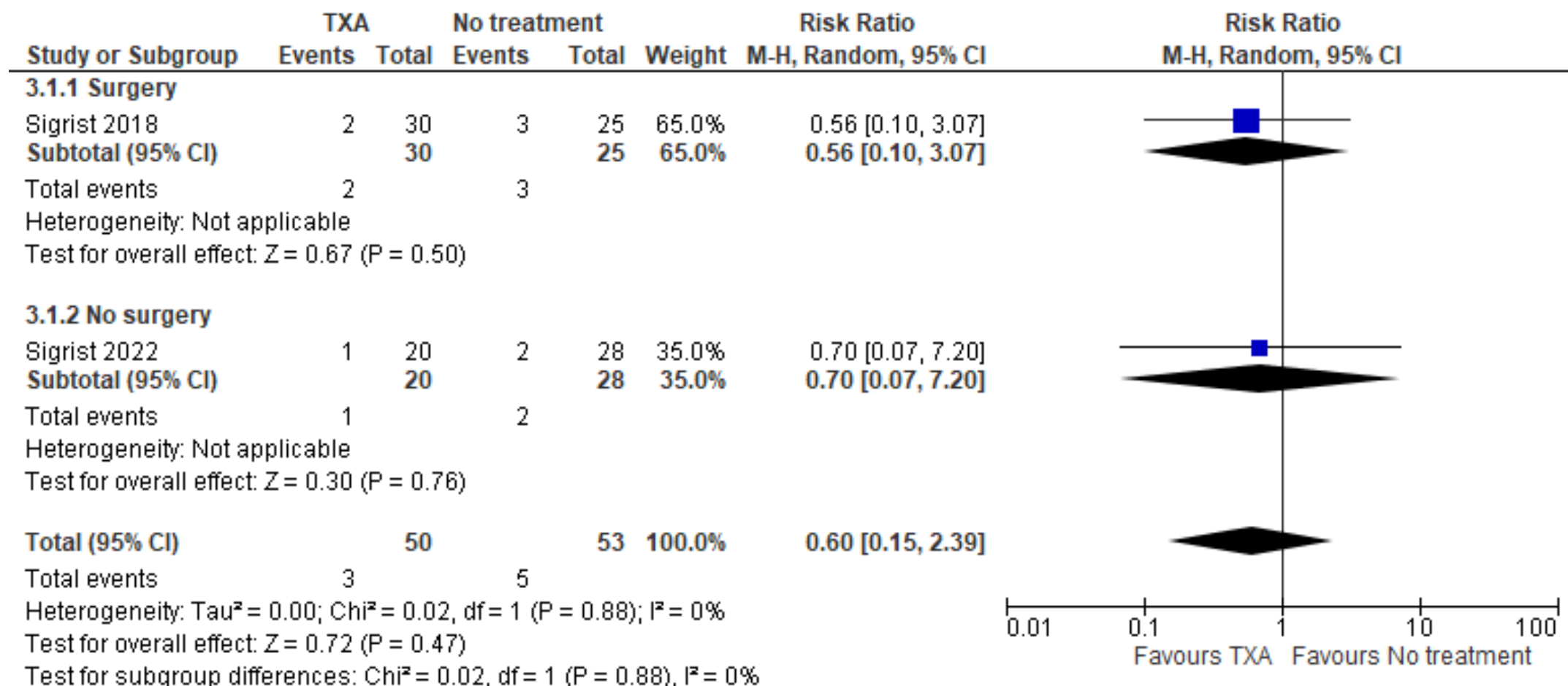
[https://doi.org/
10.17236/sat00357](https://doi.org/10.17236/sat00357)

The study population consisted of 48 dogs treated in the period 2009–2020 at the Small Animal Clinic of the Vetsuisse Faculty of Zurich. Twenty-eight of 48 dogs were treated with 20 mg/kg TXA IV within 3h of diagnosis of haemoabdomen. Dogs treated with and without TXA were monitored over 48 hours for signs of ongoing haemorrhage. Ongoing haemorrhage was defined as an increase

Transfusiones



Mortalidad



Pirámide de la evidencia



Received: 1 December 2021 | Revised: 1 February 2022 | Accepted: 18 March 2022

DOI: 10.1111/vec.13279

CASE REPORT



Use of recombinant human factor VIIa in 2 patients with postoperative noncompressible, abdominal hemorrhage

Chelsea M. Zorn DVM | April E. Blong DVM, DACVECC  | Rebecca Walton DVM, DACVECC 

Case Summary: A 14-year-old neutered female Border Terrier and a 9-year-old neutered male domestic shorthair were treated with rFVIIa to treat noncompressible abdominal hemorrhage in the postoperative period. The dog presented for a septic abdomen following endoscopic intestinal biopsies 10 days prior and was found to have a jejunal perforation along with a fractured liver lobe and hepatic lymphoma at the time of exploratory laparotomy. The cat presented for a spontaneous hemoabdomen associated with hepatic amyloidosis. Clinically significant hemorrhage occurred in the perioperative and postoperative period and both patients received massive transfusions and antifibrinolytic therapy. Despite these interventions, the patients continued to have ongoing abdominal hemorrhage and surgical attempts at hemostasis were not attempted due to the friable nature of the liver at the time of surgery. Both patients received rFVIIa intravenously every 3 hours at a dose between 70 and 90 $\mu\text{g}/\text{kg}$ as indicated by the clinical picture, which subsequently decreased transfusion requirements.



socrative

by MasteryConnect