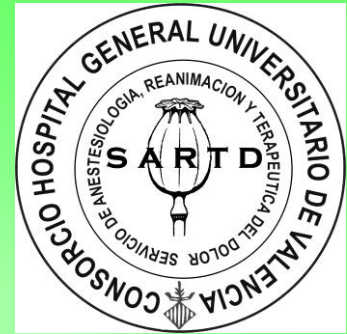




CONSORCI
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UNIVERSITARI
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POLITRAUMATISMO Y TRANSFUSION MASIVA DE SANGRE

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**Servicio de Anestesia Reanimación y Tratamiento del Dolor
Consorcio Hospital General Universitario
Valencia**

**Sartd-CHGUV Sesión de Formación Continuada
Valencia Fecha 04-05-2010**

INTRODUCCIÓN

En Europa la enfermedad traumática lidera las principales causas de muerte en las primeras cuatro décadas de vida

Problema fundamental de salud pública. Elevados costos asistenciales

1 / 3 pacientes precisa asistencia en UCC. EM 5 días

Mortalidad debida a ET presenta distribución trimodal

- + Primer pico: primeros minutos del accidente
- + Segundo pico: primeras horas tras el traumatismo
- + Tercer pico: días o semanas después

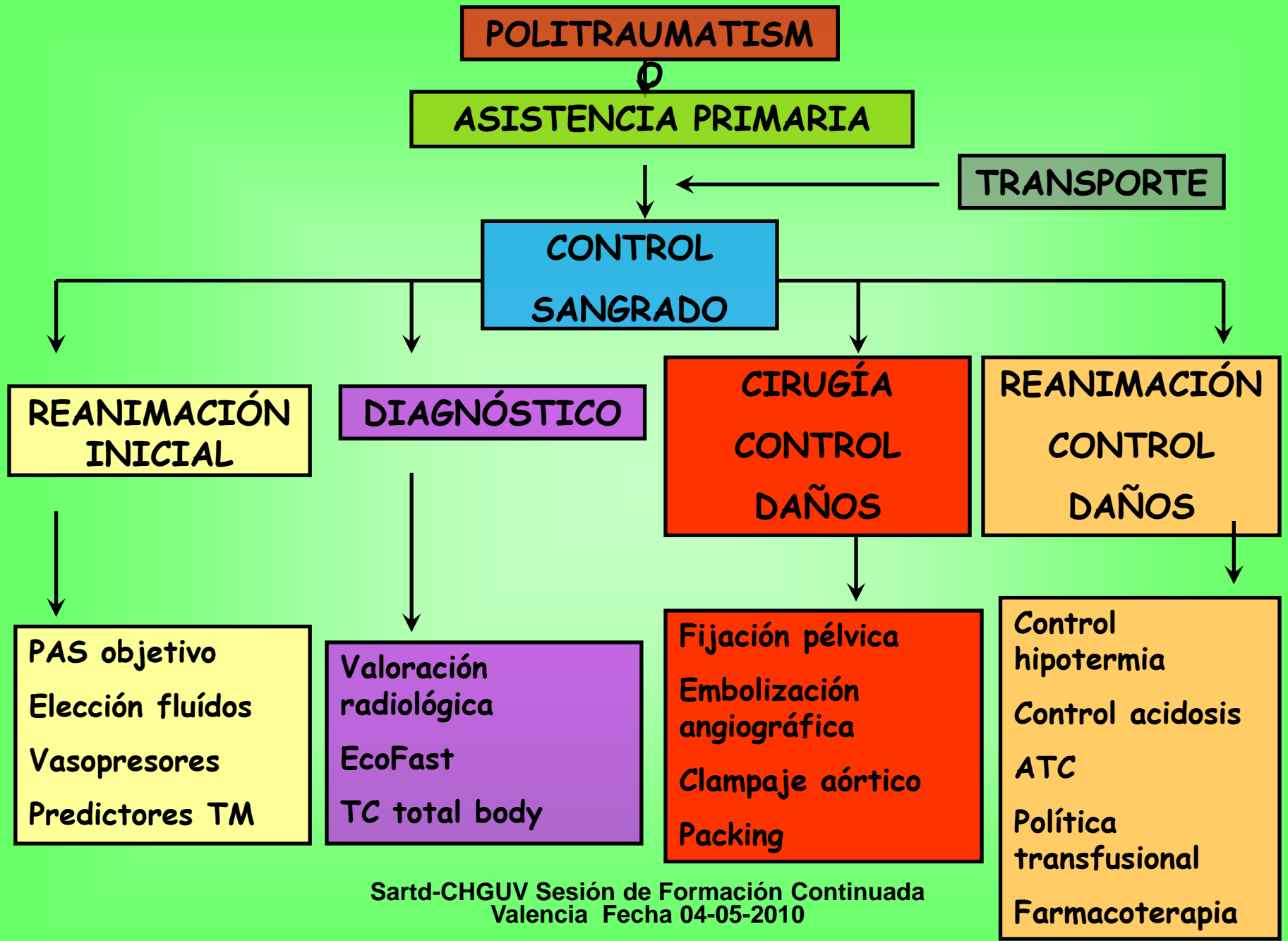
El sangrado incontrolado contribuye entre un 30 y un 40 % de las muertes relacionadas con traumatismos. El sangrado masivo se ha convertido en la principal causa de muerte potencialmente controlable.

DEFINICIONES

Politraumatismo: asociación de múltiples lesiones traumáticas producidas por un mismo accidente y que suponen, aunque solo sea una de ellas, riesgo vital para el paciente

Hemorragia masiva: en pacientes traumáticos; pérdida de una volemia en 24 horas o pérdida de media volemia en 3 horas.

Transfusión masiva: transfusión de diez o más unidades de concentrados de hematíes en un periodo de 24 horas.



POLITRAUMATISM

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REANIMACIÓN INICIAL

DIAGNÓSTICO

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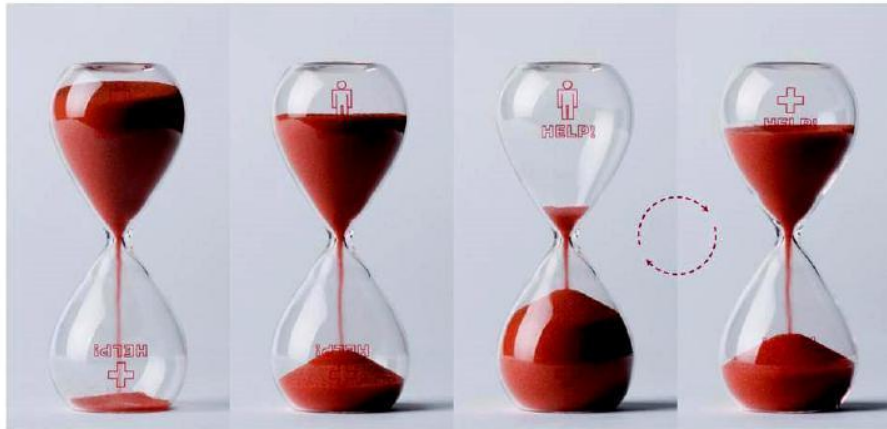
REANIMACIÓN CONTROL DAÑOS

PAS objetivo
Elección flúidos
Vasopresores
Predictores TM

Valoración radiológica
EcoFast
TC total body

Fijación pélvica
Embolización angiográfica
Clampaje aórtico
Packing

Control hipotermia
Control acidosis
ATC
Política transfusional
Farmacoterapia



¿ CUANTO TIEMPO DEBE PASAR ENTRE LA LESIÓN Y LA ATENCIÓN INICIAL ?

“ El tiempo transcurrido entre la lesión y la intervención quirúrgica para el control quirúrgico del sangrado debe ser minimizado”

1 A

Recommendation 1

We recommend that the time elapsed between injury and operation be minimised for patients in need of urgent surgical bleeding control. (Grade 1A).

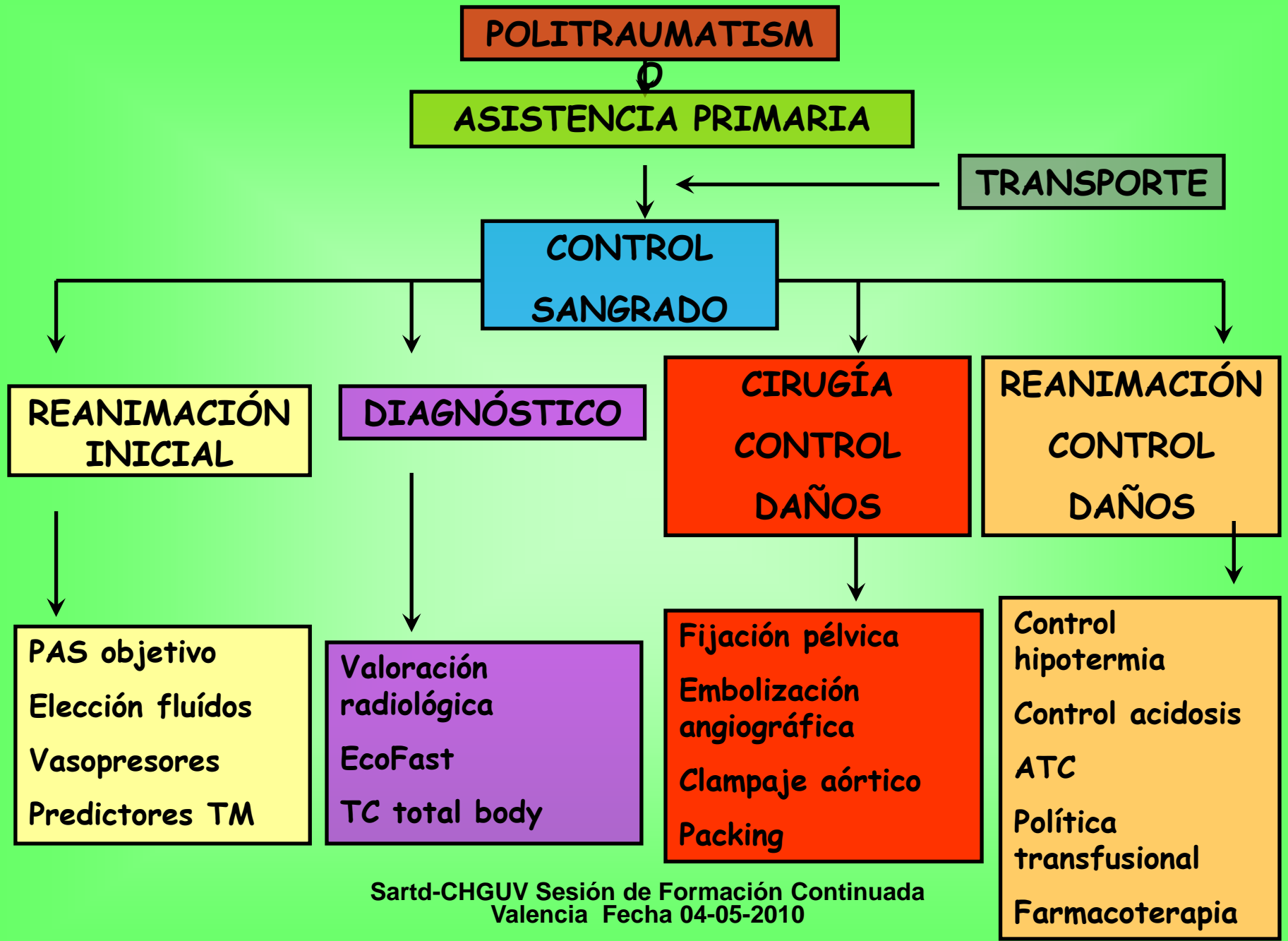
This Provisional PDF corresponds to the article as it appeared upon acceptance. Copyedited and fully formatted PDF and full text (HTML) versions will be made available soon.

Management of bleeding following major trauma: an updated European guideline

Critical Care 2010, **14**:R52 doi:10.1186/cc8943

Grading of recommendations after Guyatt *et al.* [8]

Grade of recommendation	Clarity of risk/benefit	Quality of supporting evidence	Implications
1A Strong recommendation, high-quality evidence	Benefits clearly outweigh risk and burdens, or vice versa	Randomised controlled trials (RCTs) without important limitations or overwhelming evidence from observational studies	Strong recommendations, can apply to most patients in most circumstances without reservation
1B Strong recommendation, moderate-quality evidence	Benefits clearly outweigh risk and burdens, or vice versa	RCTs with important limitations (inconsistent results, methodological flaws, indirect, or imprecise) or exceptionally strong evidence from observational studies	Strong recommendations, can apply to most patients in most circumstances without reservation
1C Strong recommendation, low-quality or very low-quality evidence	Benefits clearly outweigh risk and burdens, or vice versa	Observational studies or case series	Strong recommendation but may change when higher-quality evidence becomes available
2A Weak recommendation, high-quality evidence	Benefits closely balanced with risks and burden	RCTs without important limitations or overwhelming evidence from observational studies	Weak recommendation, best action may differ depending on circumstances or patients' or societal values
2B Weak recommendation, moderate-quality evidence	Benefits closely balanced with risks and burden	RCTs with important limitations (inconsistent results, methodological flaws, indirect, or imprecise) or exceptionally strong evidence from observational studies	Weak recommendation, best action may differ depending on circumstances or patients' or societal values
2C Weak recommendation, low-quality or very low-quality evidence	Uncertainty in the estimates of benefits, risks, and burden; benefits, risk, and burden may be closely balanced	Observational studies or case series	Very weak recommendation, other alternatives may be equally reasonable

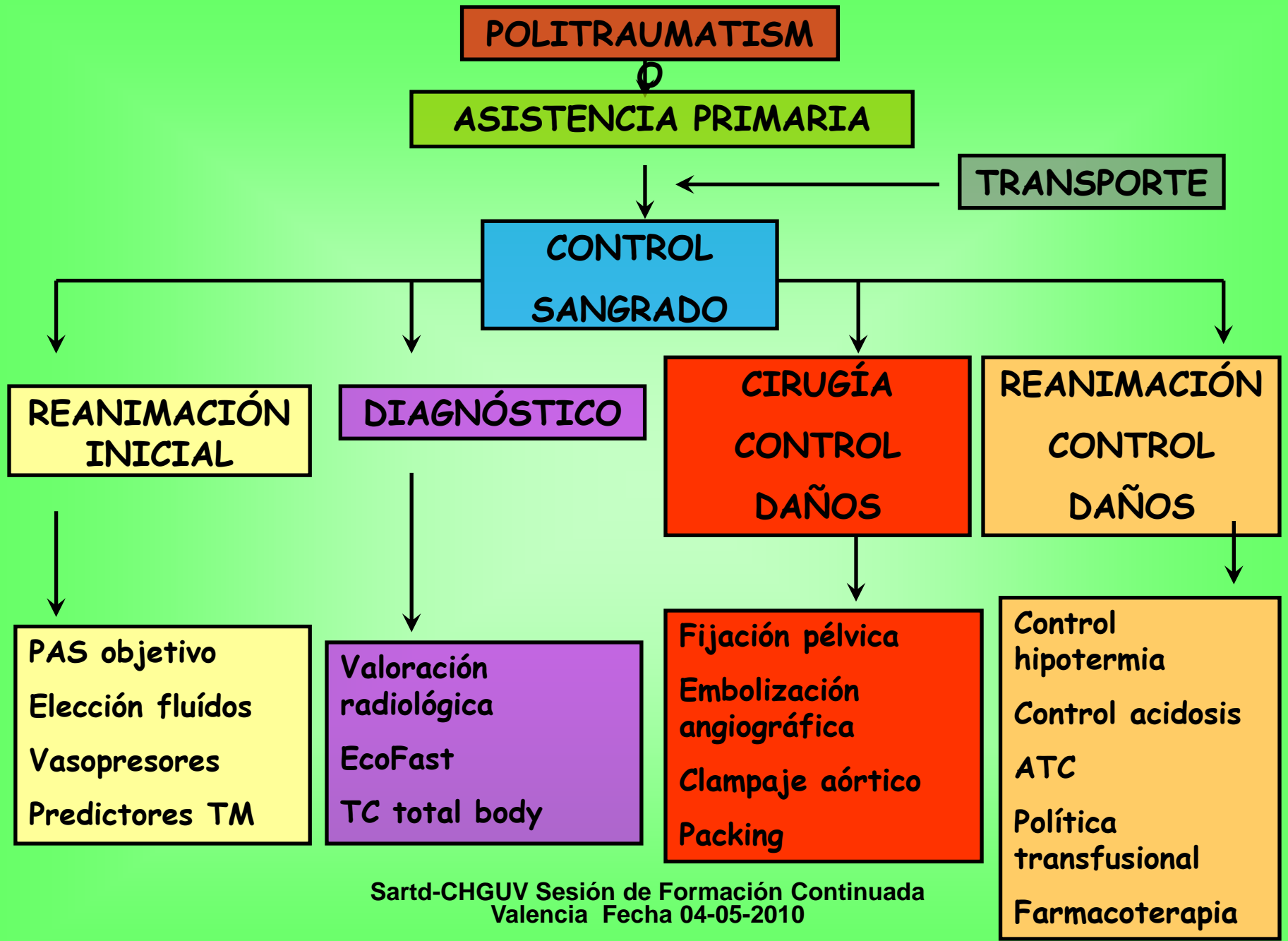


CONTROL SANGRADO



Recommendation 5

We recommend that patients presenting with haemorrhagic shock and an identified source of bleeding undergo an immediate bleeding control procedure unless initial resuscitation measures are successful. (Grade 1B).



POLITRAUMATISM

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 Predictores TM

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 TC total body

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 Clampaje aórtico
 Packing

Control hipotermia
 Control acidosis
 ATC
 Política transfusional
 Farmacoterapia

REANIMACIÓN INICIAL

¿ PAS OBJETIVO ?

" PAS objetivo 80 - 100 mmHg hasta que el sangrado se haya detenido en la fase inicial del traumatismo sin lesión cerebral "

1 C



REANIMACIÓN INICIAL



**¿ QUÉ FLUIDOTERAPIA DEBEMOS
USAR EN REANIMACIÓN INICIAL ?**

**“ Cristaloideos en tratamiento inicial”
1 B**

**“ Añadir coloides en pacientes
hemodinamicamente inestables”**

2 C

REANIMACIÓN INICIAL

tively [10–12]. Furthermore, several adverse effects (renal failure, bleeding complications and anaphylaxis) have been reported with the use of artificial colloids [17]. Colloids are not superior to crystalloids in treating hypovolemia in critically ill patients and show no survival benefit [6]. The use of crystalloids is currently recommended in trauma resuscitation [65].

“ Cristaloideos en tratamiento inicial”
1 B

“ Añadir coloides en pacientes hemodinamicamente inestables”
2 C

¿ DEBEMOS USAR VASOPRESORES ?

Anesthesiology 2007; 107:529-30

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Management of Uncontrolled Hemorrhagic Shock

Toward a New Clinical Approach?

and the nature of solution to be used. The use of vasopressor agents, although not recommended as first-line treatment of patients with hemorrhagic shock, might help to restore rapidly blood pressure to the desired level, while limiting the volume of fluid infused. In this issue of ANESTHESIOLOGY, Poloujadoff *et al.*² examined the effects of norepinephrine in combination with saline infusion on short-term survival in ketamine-anesthetized

of vasopressors if pulseless electrical activity or bradysystolic rhythm is imminent. In a liver trauma

¿ DEBEMOS USAR VASOPRESORES ?

CATECOLAMINAS
ADR, NOR

INOTROPISMO CARDIACO
RESISTENCIAS VASCULARES

VASOPRESINA

RESISTENCIAS VASCULARES

Vasopressin in vasodilatory shock: hemodynamic stabilization at the cost of the liver and the kidney?

Hendrik Bracht¹, Pierre Asfar², Peter Radermacher¹ and Enrico Calzia¹

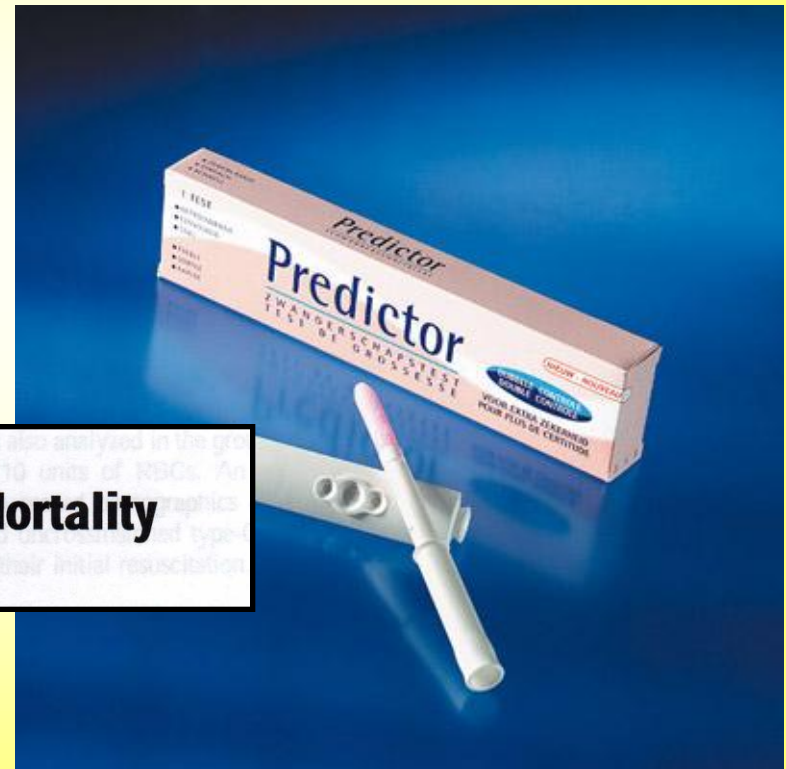
REANIMACIÓN INICIAL

¿ CÓMO PODEMOS PREDECIR QUÉ PACIENTES VAN A NECESITAR UNA TRANSFUSIÓN MASIVA ?

“ Sería útil definir los nexos entre requerimientos transfusionales y resultados, especialmente en cuanto a mortalidad, tiempo de estancia y fallo multiorgánico ”

Database Predictors of Transfusion and Mortality

Richard P. Dutton, MD, MBA, Rolf Lefering, PhD, and Mauricio Lynn, MD



REANIMACIÓN INICIAL

PREDICTORES CLÍNICOS DE TM

BAKER

PAS < 90 mmHg
FC > 120 lpm
GCS < 9
Herida de alto ries

taquicardia
hipotension

GTR - TASH

Hb
EB
PAS
FC
Liq libre
Fr abiertas
Fr pelvis

ABC

Mecanismo penetrante
PAS < / = 90 mmHg
FC = / > 120 lpm
Ecografía FAST

REANIMACIÓN INICIAL

PREDICTORES ANALÍTICOS DE TM

ÁCIDO LÁCTICO

" Ácido láctico como test sensible para estimar y monitorizar la extensión del sangrado y del shock "

1 B



Marcador indirecto del débito de oxígeno, hipoperfusión tisular y de la severidad del shock hemorrágico.

Los cambios en las concentraciones de lactato muestran una prematura y objetiva evaluación en la respuesta a la terapia y representan un pronóstico fiable del índice de pacientes con shock hemorrágico

REANIMACIÓN INICIAL

PREDICTORES ANALÍTICOS DE TM

EXCESO BASES

“ El exceso de bases lo recomiendan como un test sensible para monitorizar la extensión del sangrado y del shock ”

1 B

Aporta una estimación indirecta de la acidosis tisular global debido a la hipoperfusión

Es incluso mejor marcador pronóstico de muerte que el pH arterial

REANIMACIÓN INICIAL

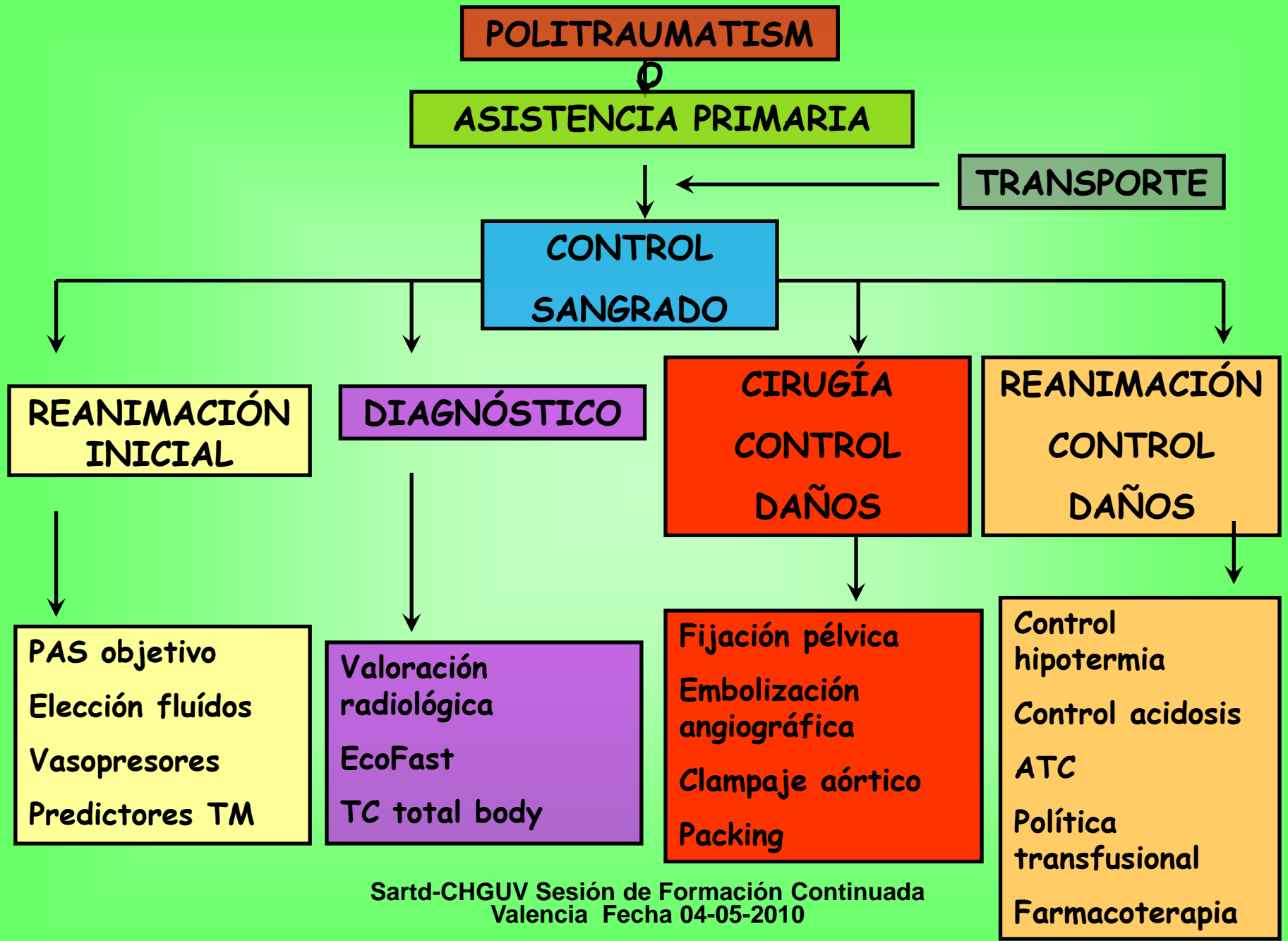
PREDICTORES ANALÍTICOS DE TM

ÁCIDO LÁCTICO

EXCESO BASES

Aunque ambos marcadores se correlacionan bien con el grado de shock, no estrictamente se correlacionan el uno con el otro en pacientes graves.

Por tanto, la evaluación independiente de ambos parámetros se recomienda para la valoración del shock en este tipo de pacientes



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Farmacoterapia

DIAGNÓSTICO



Recommendation 6

We recommend that patients presenting with haemorrhagic shock and an unidentified source of bleeding undergo immediate further investigation. (Grade 1B).

¿ CUAL ES LA PRUEBA DE IMAGEN MÁS ADECUADA ?

DIAGNÓSTICO

Recommendation 7

We recommend early imaging (FAST or CT) for the detection of free fluid in patients with suspected torso trauma. (Grade 1B).



DIAGNÓSTICO

Recommendation 9

We recommend further assessment using computed tomography for haemodynamically stable patients who are either suspected of having torso bleeding or have a high risk mechanism of injury. (Grade 1B).

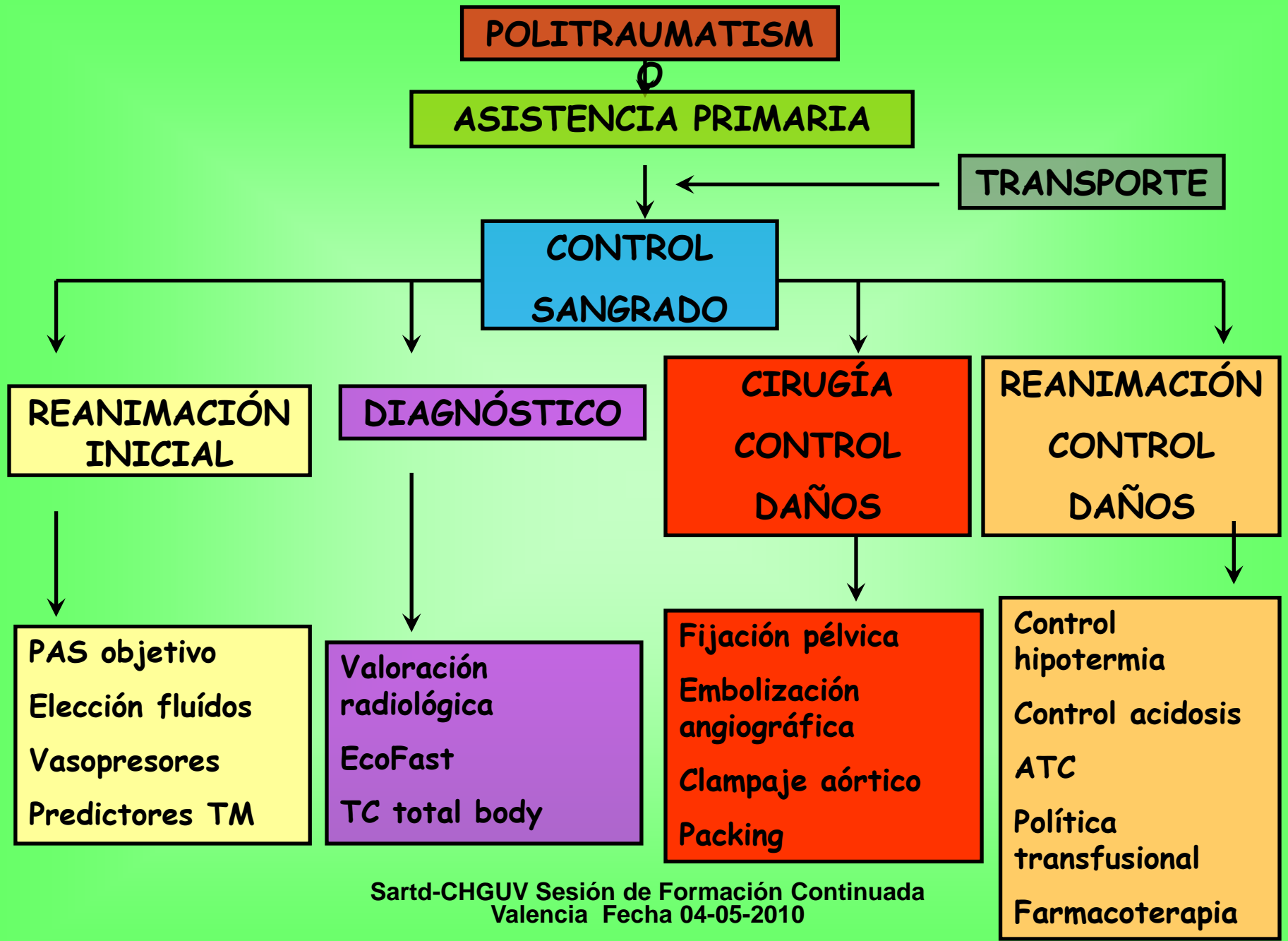


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DIAGNÓSTICO

probability of survival in patients with polytrauma. Whole-body CT as a standard diagnostic tool during the earliest resuscitation phase for polytraumatised patients provides the added benefit of identifying head and chest injuries and other bleeding sources in multiply injured patients.

Técnicas de imagen como **radiografías simples de tórax o pelvis pueden ser útiles**



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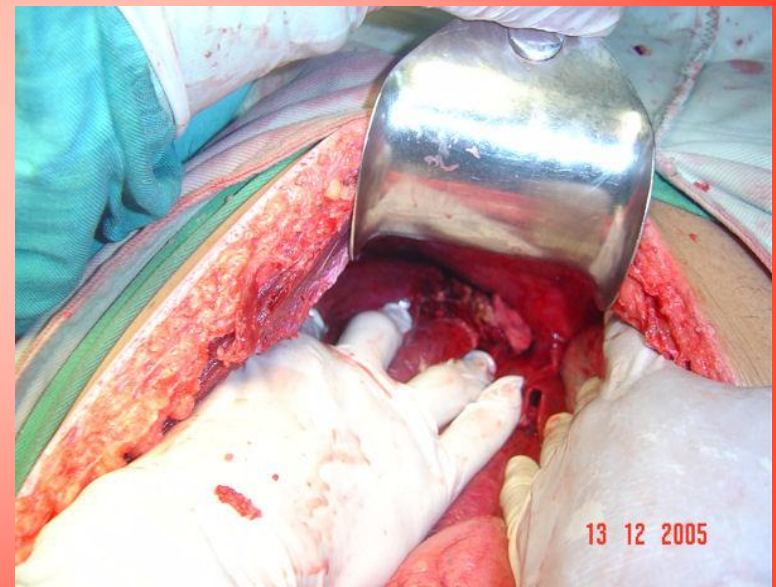
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CIRUGIA CONTROL DAÑOS

El término "control de daños" implica la aplicación de **técnicas precoces y agresivas para salvar la vida**, y describe técnicas quirúrgicas de **rápido control de la hemorragia y contención de la contaminación**.



CIRUGIA CONTROL DAÑOS

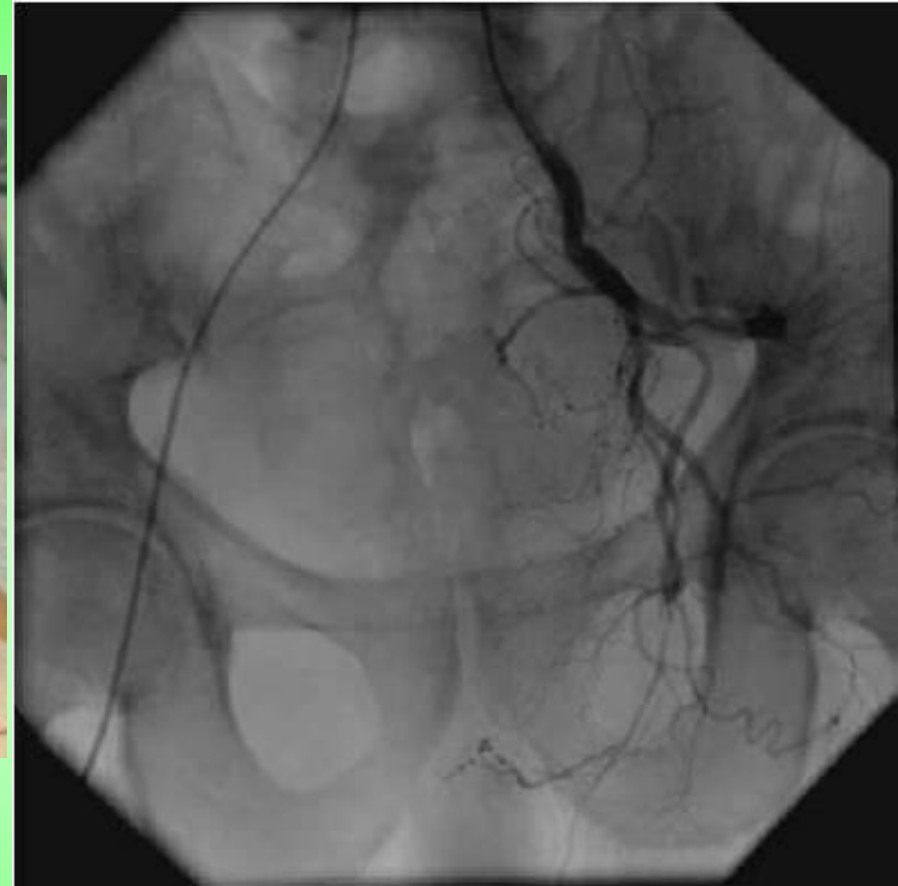
En aquellos pacientes con fracturas de pelvis y en shock hemorrágico se recomienda una fijación y estabilización inmediatas

1 B

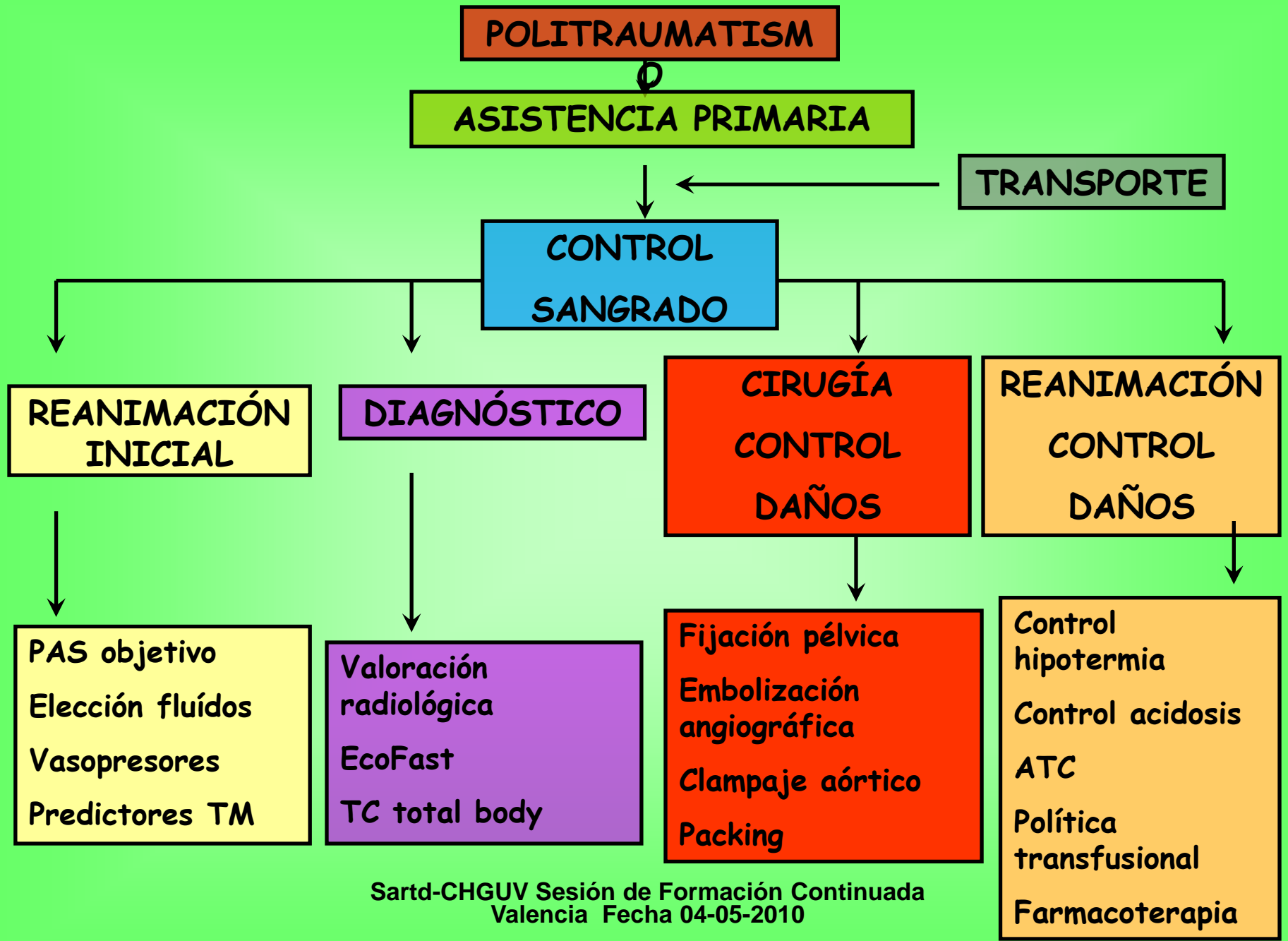
Pacientes hemodinámicamente inestables, a pesar de una adecuada estabilización pélvica, recomiendan una embolización angiográfica precoz o un control quirúrgico del sangrado incluyendo packing

1 B

CIRUGIA CONTROL DAÑOS



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REANIMACIÓN DE CONTROL DE DAÑOS

La reanimación de control de daños describe la rápida corrección de la hipotermia, acidosis y el tratamiento directo de la coagulopatía

New developments in massive transfusion in trauma

Sarah E. Greer^a, Kurt K. Rhynhart^a, Rajan Gupta^a and Howard L. Corwin^b

Dartmouth Hitchcock Medical Center, Departments of ^aSurgery and ^bAnesthesiology, Lebanon, New Hampshire, USA

Correspondence to Kurt K. Rhynhart, MD, Dartmouth Hitchcock Medical Center, Department of Surgery, One Medical Center Drive, Lebanon, NH 03756, USA
Tel: +1 603 650 8022; fax: +1 603 650 8030;
e-mail: kurt.k.rhynhart@hitchcock.org

Current Opinion in Anaesthesiology 2010, 23:000–000

Purpose of review

Trauma patients requiring massive transfusion represent a population at high risk for potentially preventable death. This review describes recent advances in the early recognition and treatment of the coagulopathy of trauma, as well as ongoing work to define optimal resuscitation strategies.

Recent findings

Damage control resuscitation involves the rapid correction of hypothermia and acidosis, direct treatment of coagulopathy, and early transfusion in trauma patients. Recent

REANIMACIÓN DE CONTROL DE DAÑOS

¿ CÓMO INFLUYE LA HIPOTERMIA ?



$T^{\circ} < 32^{\circ} C$ se ha asociado con un 100% de mortalidad

Temperatura corporal central inferior a $35^{\circ} C$ se asocia con acidosis, hipotensión y coagulopatía en pacientes gravemente heridos

when core temperatures fall below $32^{\circ}C$,⁶⁴ although it is unclear whether this degree of hypothermia is simply a marker of the severity of shock rather than the point at which profound dysfunction leads to mortality.⁶⁵ Within the tem-

REANIMACIÓN DE CONTROL DE DAÑOS

¿ CÓMO INFLUYE LA HIPOTERMIA ?

Early Predictors of Transfusion and Mortality After Injury: A Review of the Data-Based Literature

Brian J. Eastridge, MD, Debra Malone, MD, and John B. Holcomb, MD, FACS

Key Words: Trauma, Blood, Transfusion, Hemorrhage, Mortality, Outcome, Prediction.

J Trauma. 2006;60:S20-S25.



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Actividad del FT o del FVIIa disminuye linealmente con la temperatura

Activación plaquetar está totalmente ausente por debajo de 30° C

Luna y cols. mostraron que los requerimientos transfusionales son directamente proporcionales a la gravedad de la herida e inversamente proporcionales a la temperatura central

Riesgo incrementado de sangrado masivo y representa un factor de riesgo independiente de muerte y sangrado.



REANIMACIÓN DE CONTROL DE DAÑOS



¿ Mejora la coagulopatía con la corrección de la acidosis ?

Típicamente producida por estados de shock por bajo flujo

Por sí misma afecta a la función de las proteasas plasmáticas

La actividad del complejo FXa/Va se reduce hasta un 50% con un pH de 7,2, un 70% con un pH de 7,0 y un 90% con un pH de 6,8

to increased degradation of fibrinogen.⁶⁸ Further, although acidemia can be corrected by the administration of buffer solutions, this does not correct the coagulopathy,^{68,70} implying that the acid effect is more than simply a physical reduction in protease activity. There is, therefore, likely

REANIMACIÓN DE CONTROL DE DAÑOS

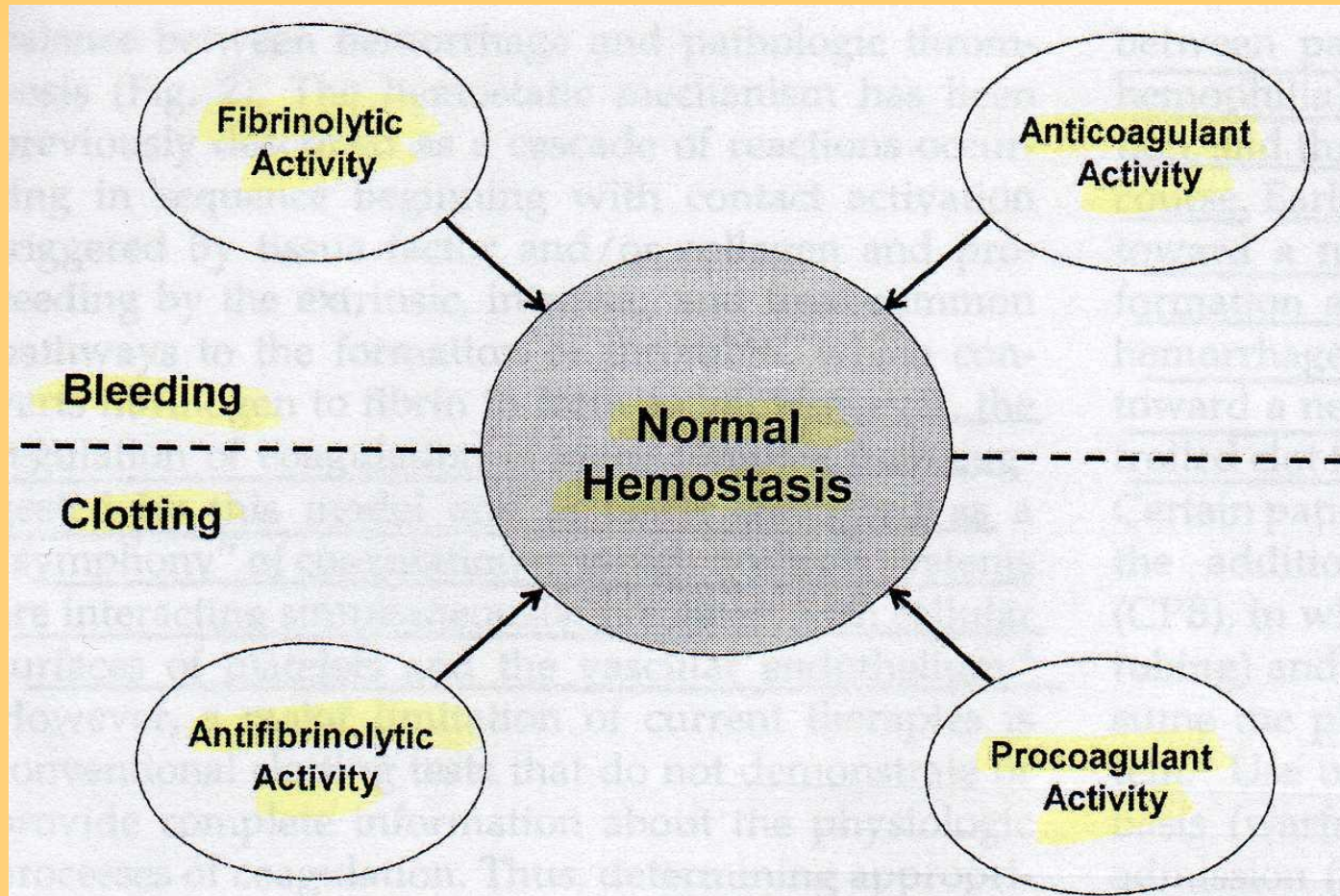
Coagulopathy in trauma patients: what are the main influence factors?

Christopher V. Maani^a, Peter A. DeSocio^a and John B. Holcomb^b

Recent studies have demonstrated that although acidosis alone can worsen coagulopathy by inhibiting the enzyme complexes that are vital to clot formation, the combination of acidosis and hypothermia can lead to severe coagulopathy and disastrous consequences. Dirkmann

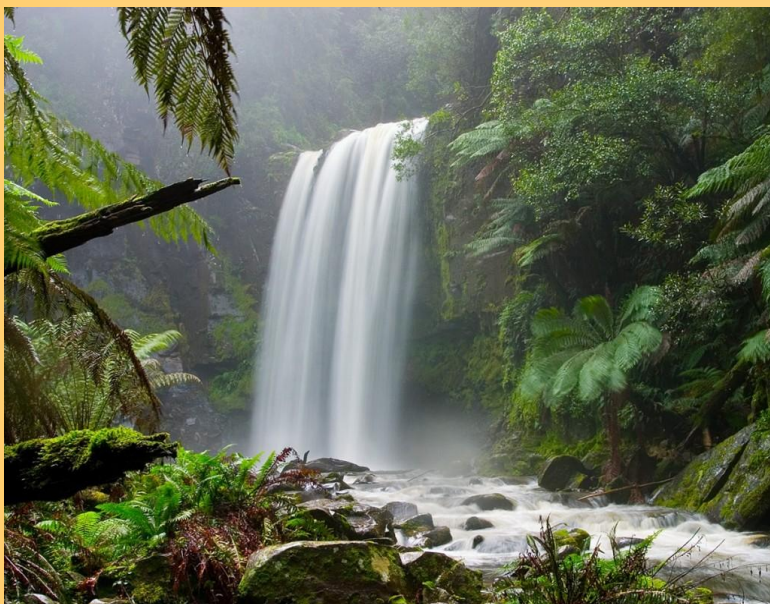


REANIMACIÓN DE CONTROL DE DAÑOS



La hemostasia se puede considerar como el control del sangrado mediante la actividad balanceada de las vías procoagulantes / anticoagulantes, fibrinolíticas / antifibrinolíticas

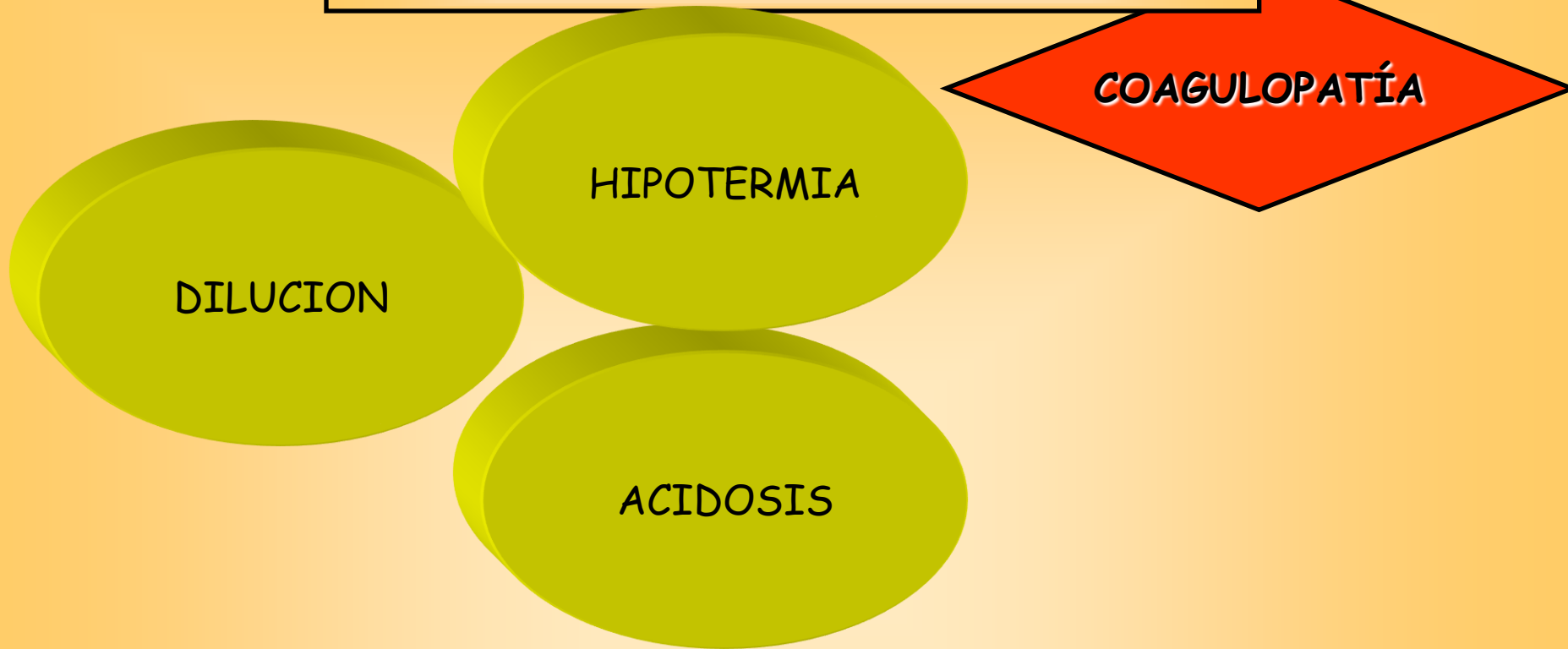
REANIMACIÓN DE CONTROL DE DAÑOS



Se ha descrito como una "sinfonía" en la que múltiples sistemas interactúan simultáneamente en contacto con la superficie de las plaquetas y el endotelio vascular

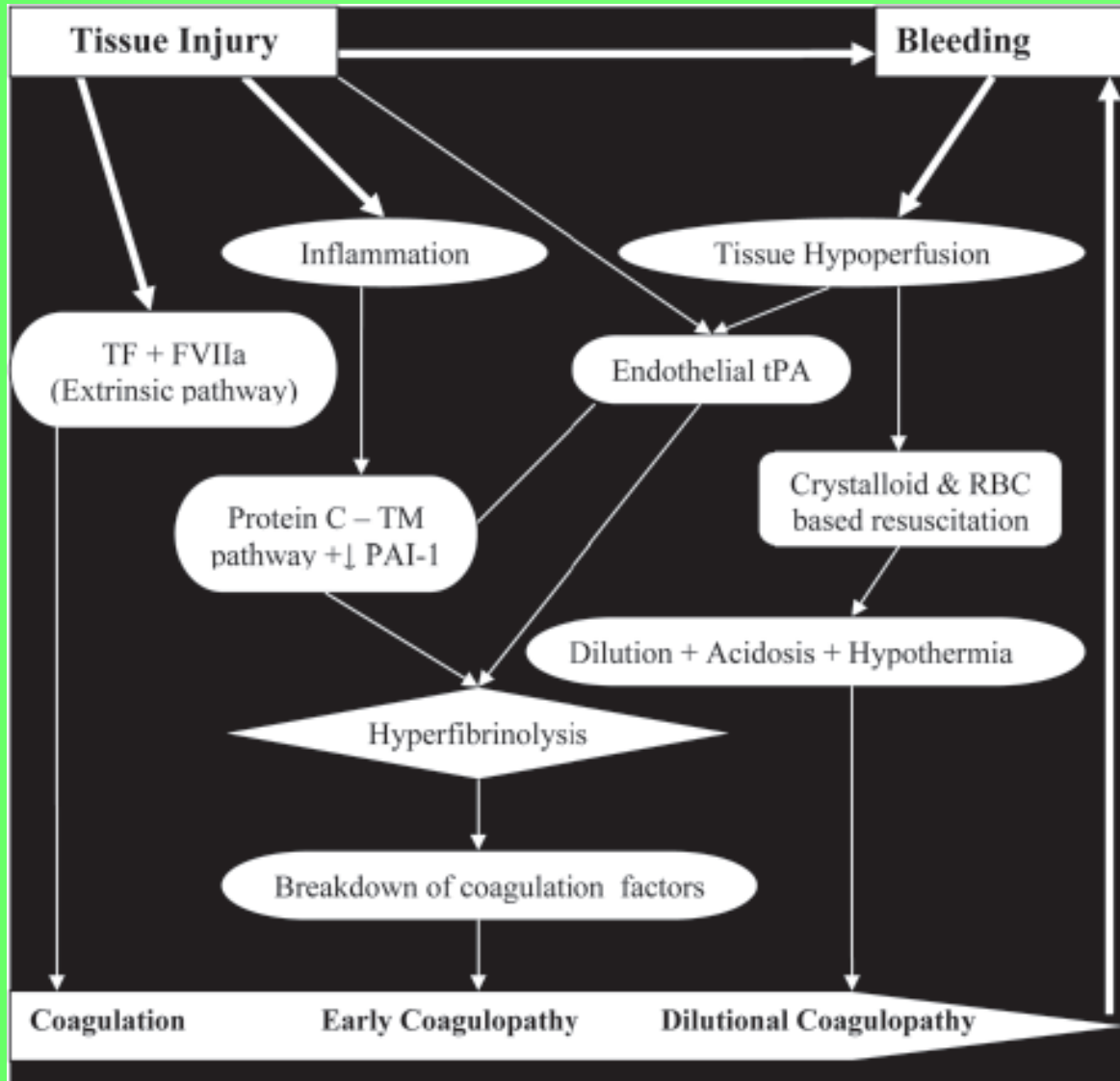
Factores adicionales tales como la inflamación, el trauma tisular, shock, hemodilución, hipotermia, acidosis o enfermedades subyacentes pueden afectar al balance de la hemostasia afectando al endotelio o a la función plaquetar.

REANIMACIÓN DE CONTROL DE DAÑOS



Aunque la dilución de los factores de la coagulación contribuye, no es simplemente resultado de la resucitación, hipotermia o ambos. **La coagulopatía del trauma es un fenómeno prematuro y multifactorial.** A menudo se presenta incluso antes de los efectos dilucionales de la resucitación

REANIMACIÓN DE CONTROL DE DAÑOS



COAGULOPATÍA

REANIMACIÓN DE CONTROL DE DAÑOS

COAGULOPATIA AGUDA DEL TRAUMA
(ATC)

COAGULOPATÍA

Es una coagulopatía endógena que se presenta en el momento de la admisión en urgencias en cerca del 25 % de los pacientes

25% más de posibilidades de fallecer y son más propensos a requerir TM y desarrollar FMO

REANIMACIÓN DE CONTROL DE DAÑOS

COAGULOPATIA AGUDA DEL TRAUMA (ATC)

COAGULOPATÍA

Leading article

Diagnosis and management of coagulopathy after major trauma

K. Brohi

Barts and the London School of Medicine and Dentistry, Queen Mary University of London, UK
(e-mail: karim@trauma.org)

Published online in Wiley InterScience (www.bjs.co.uk). DOI: 10.1002/bjs.6691

to develop multiple organ failure. ATC is induced by the combination of trauma and shock, and is driven by the degree of tissue hypoperfusion. This appears to cause a systemic activation of the anticoagulant protein C pathway, resulting in inhibition of coagulation, decreased fibrinogen utilization and increased fibrinolysis³. With continuing bleeding, shock and transfusion, the other drivers of TIC (dilution, hypothermia and acidaemia) become established and worsen the haemostatic derangements. The presence of ATC

REANIMACIÓN DE CONTROL DE DAÑOS

COAGULOPATIA AGUDA DEL TRAUMA (ATC)

COAGULOPATÍA

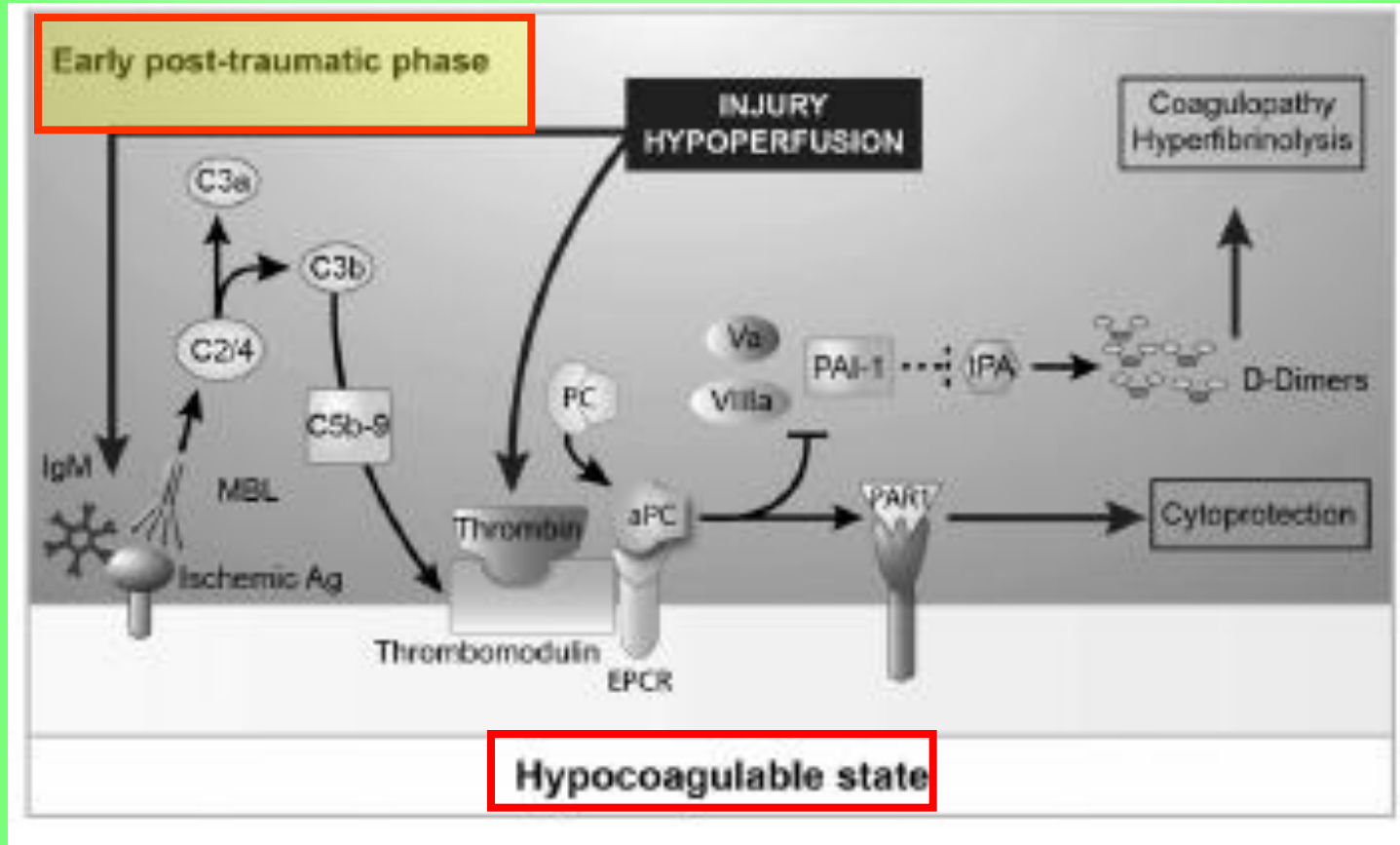
ATC se inicia por la hipoperfusión y se caracteriza por anticoagulación e hiperfibrinólisis

- Traumatismo tisular + hipoperfusión tisular, coagulopatía asociada con reducción de niveles en la vía de la proteína C
- La vía anticoagulante de la prot C se inicia cuando la trombina se une a la trombosmodulina en la superficie del endotelio
- La APC ejerce sus efectos anticoagulantes inactivando irreversiblemente los factores Va y VIIIa
- La APC tiene más actividad anticoagulante a través de la desactivación del PAI-1 resultando en aumento de la fibrinólisis

REANIMACIÓN DE CONTROL DE DAÑOS

COAGULOPATIA AGUDA DEL TRAUMA (ATC)

COAGULOPATÍA

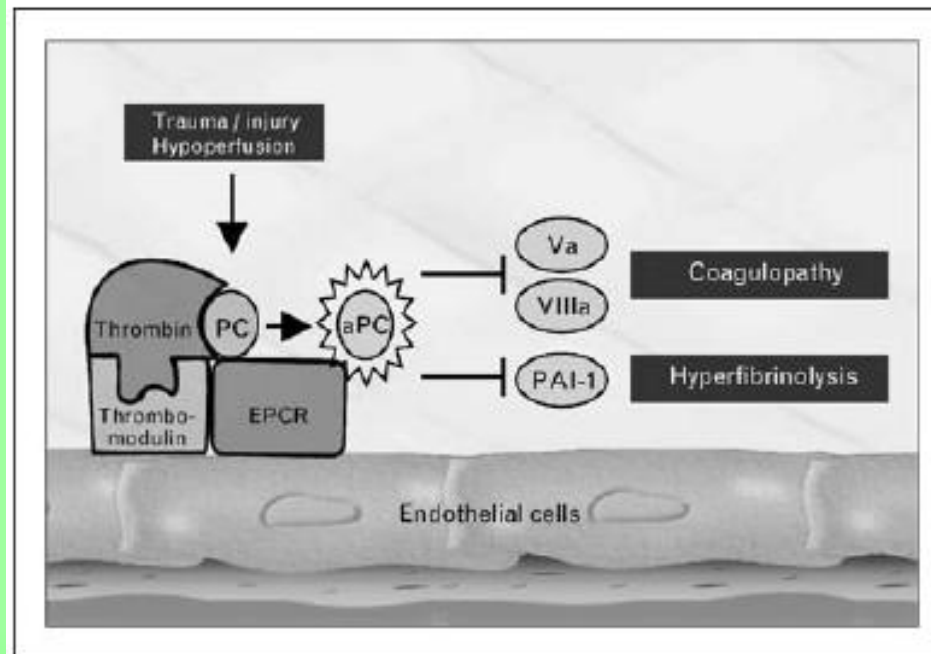


REANIMACIÓN DE CONTROL DE DAÑOS

COAGULOPATIA AGUDA DEL TRAUMA (ATC)

COAGULOPATÍA

Figure 1 Pathogenesis of acute traumatic coagulopathy



ATC se inicia por la hipoperfusión y se caracteriza por anticoagulación e hiperfibrinólisis

COAGULOPATIA AGUDA DEL TRAUMA

COAGULOPATÍA

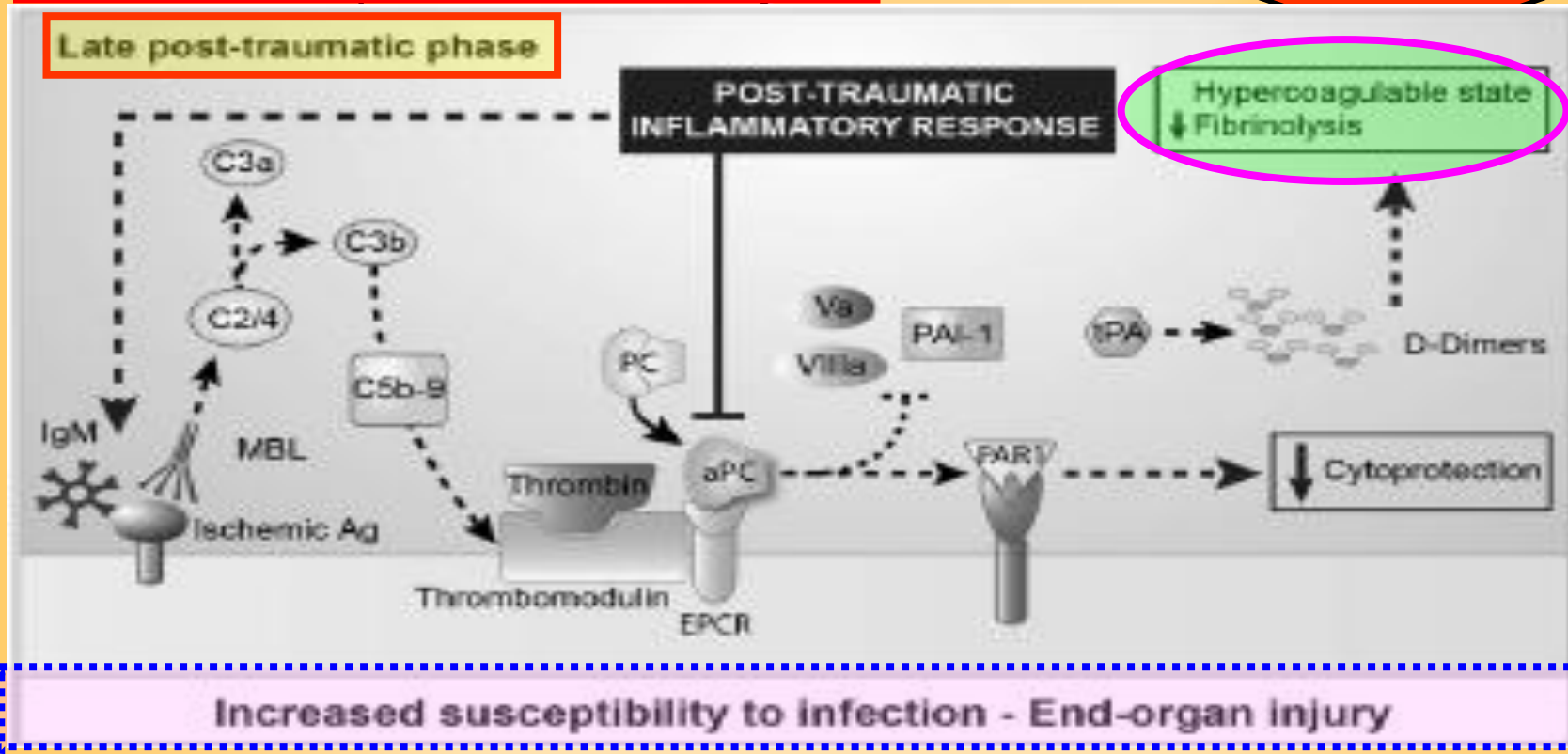


Fig. 2. Late post-traumatic phase. In the later phase after trauma, there is the development of a pro-coagulant activity associated with low plasma levels of activated protein C (aPC), an inhibition of the fibrinolysis caused by elevated plasma levels of plasminogen activator inhibitor 1 (PAI-1) and a downregulation of complement activation due to low plasma levels of mannose-binding lectins (MBL) and significant impairment of C3b deposition via the lectin and alternative pathways. These coagulation and complement abnormalities increase the susceptibility to hypercoagulability with late thrombosis, infection and end-organ injury. At the later time points the dashed lines represent inhibited or depleted pathways.

REANIMACIÓN DE CONTROL DE DAÑOS

COAGULOPATIA AGUDA DEL TRAUMA
(ATC)

COAGULOPATÍA

La prematura corrección de la coagulopatía puede llevar a

- Reducir el sangrado,
- Menor número de requerimientos transfusionales
- Mejorar la supervivencia

REANIMACIÓN DE CONTROL DE DAÑOS

POLÍTICA TRANSFUSIONAL

La concentración óptima de Hb o el Hto para mantener la hemostasia en pacientes con sangrado masivo no está claro

Recommendation 21

We recommend a target haemoglobin (Hb) of 7-9 g/dl. (Grade 1C).

Tissue trauma	Controlled	Massive and uncontrolled
Initiation of massive transfusion	No delay between hemorrhage and initiation of treatment	The interval between hemorrhage and treatment can vary widely
Volume status/shock	Normovolemia is maintained and shock is avoided	Hypovolemia and shock are frequent
Temperature	Normothermia is maintained	Hypothermia is frequent
Monitoring of hemostasis	Ongoing. Anticipation of hemostatic defects is possible	Late. Laboratory tests are obtained when coagulopathy is installed
Coagulopathy	More often related to decreased coagulation factors	Often related to disseminated intravascular coagulation
Treatment of coagulopathy	Correction of anemia FFP and platelets as determined by laboratory tests	Correction of tissue hypoperfusion Correction of hypothermia Correction of anemia Platelets and FFP as determined by laboratory tests

REANIMACIÓN DE CONTROL DE DAÑOS

Table 1 Summary of selected, recently published studies (2007/2008) in the peer-reviewed literature, analyzing the optimal dosage (ratio) of fresh frozen plasma transfusions for coagulopathic trauma patients

Citation	Patient cohort	Study center, study period	Investigated FFP concentration/ FFP:RBC ratio	Recommended FFP concentration/ FFP:RBC ratio	Pitfalls and limitations
Kashuk <i>et al.</i> [21]	$n = 133$ trauma patients, >10 RBCs/6 h	Level 1 trauma center, 2001–2006	1:1, 1:2, 1:3, 1:4, $<1:5$	1:2	Retrospective study; no mechanisms
Sperry <i>et al.</i> [43]	$n = 415$ trauma patients, ≥ 8 RBCs/12 h	Multicenter study ($n = 7$), 2003–2005	1:1, 1:2, 1:3, 1:4, $<1:5$	$\geq 1:1.5$	Retrospective study; no mechanisms
Duchesne <i>et al.</i> [44]	$n = 135$ trauma patients, >10 RBCs/24 h; $n = 250$ trauma patients, ≤ 10 RBCs/24 h	Level 1 trauma center, 2002–2006	1:1, 1:4	1:1	Retrospective study; no mechanisms
Maegele <i>et al.</i> [45]	$n = 713$ trauma patients, >10 RBCs between ED and ICU admission	German Trauma Registry (DGU), 2002–2006	$>1:1$, 1:1, $<1:1$	1:1 (?)	Retrospective analysis of a prospective database; no mechanisms
Holcomb <i>et al.</i> [46]	$n = 467$ trauma patients, ≥ 10 RBCs/24 h	Multicenter study ($n = 16$), 2005–2006	$\geq 1:2$, $<1:2$	1:1	Retrospective study; no mechanisms
Gonzalez <i>et al.</i> [17]	$n = 97$ trauma patients, ≥ 10 RBCs/24 h	Level 1 trauma center, 1998–2003	1:1	1:1	Retrospective study; no mechanisms
Spahn <i>et al.</i> [12**]	Systematic review of the literature	European guidelines by the Multidisciplinary Task Force for Advanced Bleeding Care in Trauma	Systematic review of the literature	10–15 ml/kg (initial FFP dose) for PT or aPTT $> 1.5 \times$ control	Review of the literature; recommendations based on limited available science
Spinella <i>et al.</i> [47]	$n = 708$ combat trauma patients, ≥ 1 RBCs overall	Combat support hospital, 2003–2004	0–4:2–7	Each FFP unit increased survival; each RBC unit decreased survival	Retrospective study; no mechanisms
Borgman <i>et al.</i> [48]	$n = 246$ combat trauma patients, ≥ 10 RBCs/24 h	Combat support hospital, 2003–2005	1:1.4, 1:2.5, 1:8	1:1.4	Retrospective study; no mechanisms
Gunter <i>et al.</i> [49]	$n = 259$ trauma patients, ≥ 10 RBCs/24 h	Level 1 trauma center, 2004–2006	0:1–1:2.9, 1:3–1:1.49, 1:1.5–0.9:1, $\geq 1:1$	2:3	Retrospective study; no mechanisms
Scalea <i>et al.</i> [50**]	$n = 250$ trauma patients, ≥ 1 RBC and FFP/24 h	Level 1 trauma center, prospective study, 2004–2006	1:1 versus any other ratios	1:1 does not improve outcome	Small group of patients ($n = 51$) in 1:1 cohort

(?) questionable recommendation; aPTT, activated partial thromboplastin time; DGU, Deutsche Gesellschaft für Unfallchirurgie (German Trauma Society); ED, emergency department; FFP, fresh frozen plasma; ICU, intensive care unit; PT, prothrombin time; RBC, red blood cell units.

POLÍTICA TRANSFUSIONAL

The Relationship of Blood Product Ratio to Mortality: Survival Benefit or Survival Bias?

Christopher W. Snyder, MD, Jordan A. Weinberg, MD, Gerald McGwin, Jr., MS, PhD, Sherry M. Melton, MD, Richard L. George, MD, Donald A. Reiff, MD, James M. Cross, MD, Jennifer Hubbard-Brown, BS, Loring W. Rue, III, MD, and Jeffrey D. Kerby, MD, PhD

Muchos pacientes reciben UCH inmediatamente a su llegada, seguidos más tarde de transfusión de PFC. La posibilidad de alcanzar altos ratios va aumentando conforme pasa el tiempo.

Muchas muertes ocurren de forma temprana en el hospital, momento en el cual la mayoría de los pacientes se encuentran en el grupo de bajos ratios

temporal nature of the FFP:PRBC ratio was correctly accounted for in the analysis.¹⁶ Therefore, it could be concluded that the nonsurvivors in our study population did not die because they got a lower FFP:PRBC ratio; they got a lower ratio because they died.

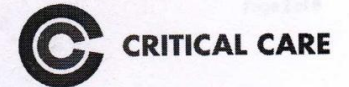
REANIMACIÓN DE CONTROL DE DAÑOS

POLÍTICA TRANSFUSIONAL

1 : 1

RESUCITACIÓN HEMOSTÁTICA

Nascimento et al. *Critical Care* 2010, 14:202
<http://ccforum.com/14/1/202>



REVIEW

Clinical review: Fresh frozen plasma in massive bleedings - more questions than answers

Bartolomeu Nascimento¹, Jeannie Callum², Gordon Rubenfeld³, Joao Baptista Rezende Neto^{4,5}, Yulia Lin² and Sandro Rizoli⁵

[3,8,9]. In trauma, a recent series of retrospective clinical studies suggests that early and aggressive use of FFP at a 1:1 ratio with red blood cells (RBC) improves survival in cases of massive haemorrhage [10-19]. Because bleeding is directly responsible for 40% of all trauma-related deaths, this strategy – also known as haemostatic damage

REANIMACIÓN DE CONTROL DE DAÑOS

POLÍTICA TRANSFUSIONAL

1 : 1

RESUCITACIÓN HEMOSTÁTICA

Table 1. Arguments for and against the adoption of early formula-driven haemostatic resuscitation in trauma

	Pros	Cons
Mortality	Retrospective studies suggesting a reduction in mortality from exsanguination	Data limited by survivorship bias Increase in FFP and platelet use might increase the risk of acute lung injury, multiple organ failure, thrombosis, sepsis and death
Coagulopathy	Prevention and treatment of coagulopathy due to transfusion of clotting factors Minimize crystalloid use (decrease the risk of dilution)	Difficult to identify patients early on who will develop coagulopathy and in fact need transfusion of FFP and platelets Uncertainty about the ideal dose of FFP in the trauma situation
Laboratory tests	No need for coagulation tests Avoid the delay of waiting for blood test results	<u>Innecessary exposure to AB plasma (in some countries, a higher risk of transfusion-related acute lung injury due to higher proportion of female donors)</u>
Blood bank systems	More timely issuing of blood components No time needed to thaw FFP (AB plasma available at all times) Decrease the need for communication between blood bank and the medical team	The waste of FFP will increase (shortage of AB plasma) May increase the complications associated with FFP and platelet transfusion

FFP, fresh frozen plasma.

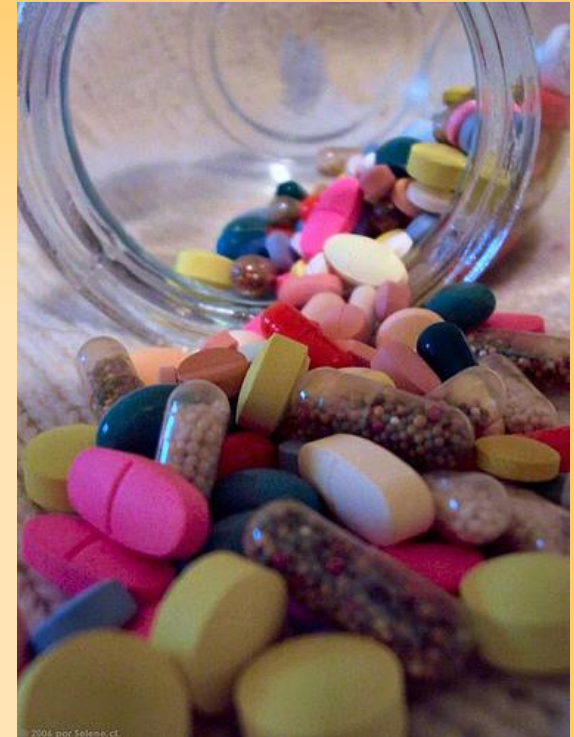
REANIMACIÓN DE CONTROL DE DAÑOS

AVANCES EN FARMACOTERAPIA

ANTIFIBRINOLÍTICOS

Ácido épsilon aminocaproico

Ácido tranexámico



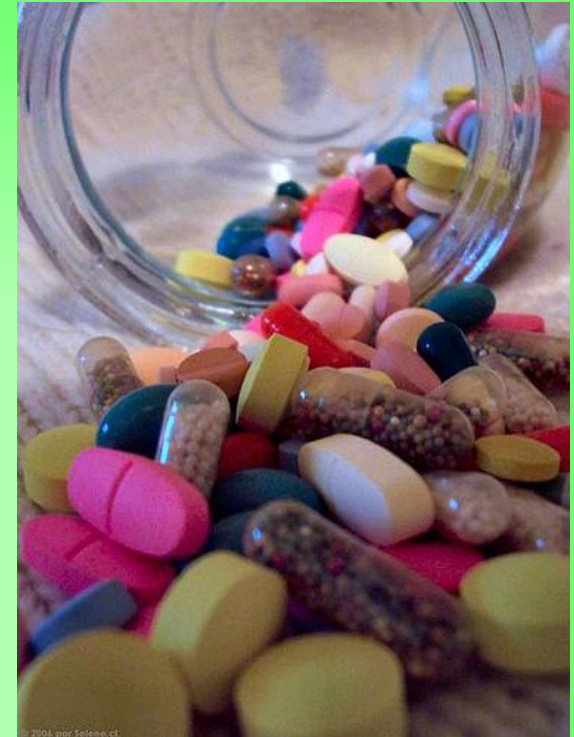
CRASH-2: determinar los efectos de la administración temprana del ácido tranexámico, en adultos con trauma que presenten, o estén en riesgo, de una hemorragia significativa

REANIMACIÓN DE CONTROL DE DAÑOS

AVANCES EN FARMACOTERAPIA

ANTIFIBRINOLÍTICOS

**NO EXISTE EVIDENCIA CIENTÍFICA
QUE APOYE EL USO PROFILÁCTICO
O EMPÍRICO DE ESTOS AGENTES**



REANIMACIÓN DE CONTROL DE DAÑOS

AVANCES EN FARMACOTERAPIA

DESMOPRESINA



Anesthesiology 2008; 109:1063-76

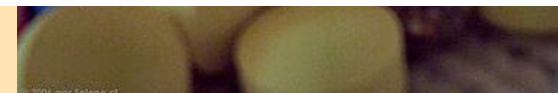
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Desmopressin Reduces Transfusion Needs after Surgery

A Meta-analysis of Randomized Clinical Trials

Giuseppe Crescenzi, M.D.,* Giovanni Landoni, M.D.,* Giuseppe Biondi-Zoccal, M.D.,† Federico Pappalardo, M.D.,‡
Massimiliano Nuzzi, M.D.,‡ Elena Bignami, M.D.,‡ Oliviero Fochi, M.D.,§ Giulia Maj, M.D.,§ Maria Grazia Calabrò, M.D.,‡
Marco Ranucci, M.D.,|| Alberto Zangrillo, M.D.#

DDAVP slightly reduced blood loss (almost 80 ml per patient) and transfusion requirements (almost 0.3 units per patient) in surgical patients, without reduction in proportion of patients who received transfusions. This meta-analysis suggests the importance of further large



NO EXISTEN ESTUDIOS EN PACIENTES

Sartd-CHGUV Sesión de Formación para Anestesiólogos
Valencia Fecha 04-05-2010

REANIMACIÓN DE CONTROL DE DAÑOS

AVANCES EN FARMACOTERAPIA

DESMOPRESINA

Anesthesiology 2008; 109:1063-76

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NO EXISTEN ESTUDIOS EN PACIENTES
POLITRAUMATIZADOS

AVANCES EN FARMACOTERAPIA

rFVIIA

[Intervention review]

Recombinant factor VIIa for the prevention and treatment of bleeding in patients without haemophilia

Authors' conclusions

Although rFVIIa has a role in the management of patients with haemophilia, its effectiveness as a more general haemostatic drug, either prophylactically or therapeutically, remains uncertain. Its effectiveness as a therapeutic agent, particularly for intra-cerebral haemorrhage, looks more encouraging than prophylactic use. The use of rFVIIa outside its current licensed indications should be very limited and its wider use await the results of ongoing and possibly newly commissioned RCTs. In the interim, rFVIIa use should be restricted to clinical trials.

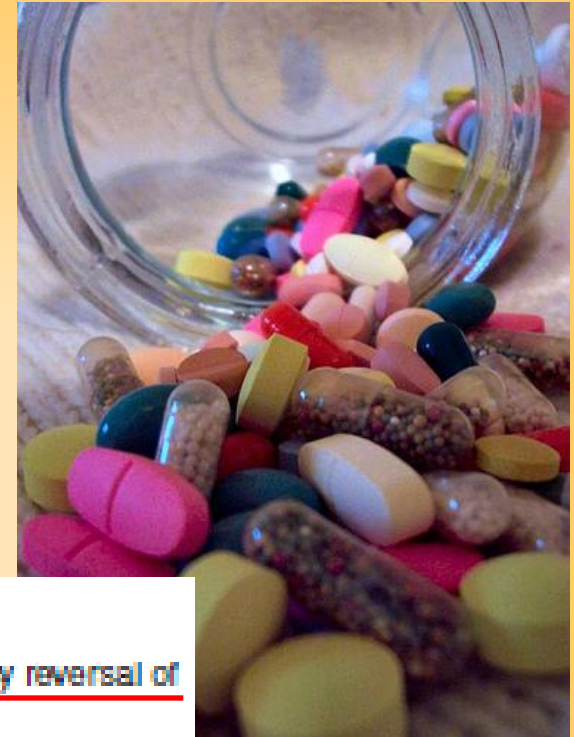
We suggest that the use of recombinant activated coagulation factor VII (rFVIIa) be considered if major bleeding in blunt trauma persists despite standard attempts to control bleeding and best-practice use of blood components. (Grade 2C).

rFVIIa is not a first-line treatment for bleeding and will be effective only once sources of major bleeding have been controlled. Once major bleeding from damaged vessels has been stopped,

REANIMACIÓN DE CONTROL DE DAÑOS

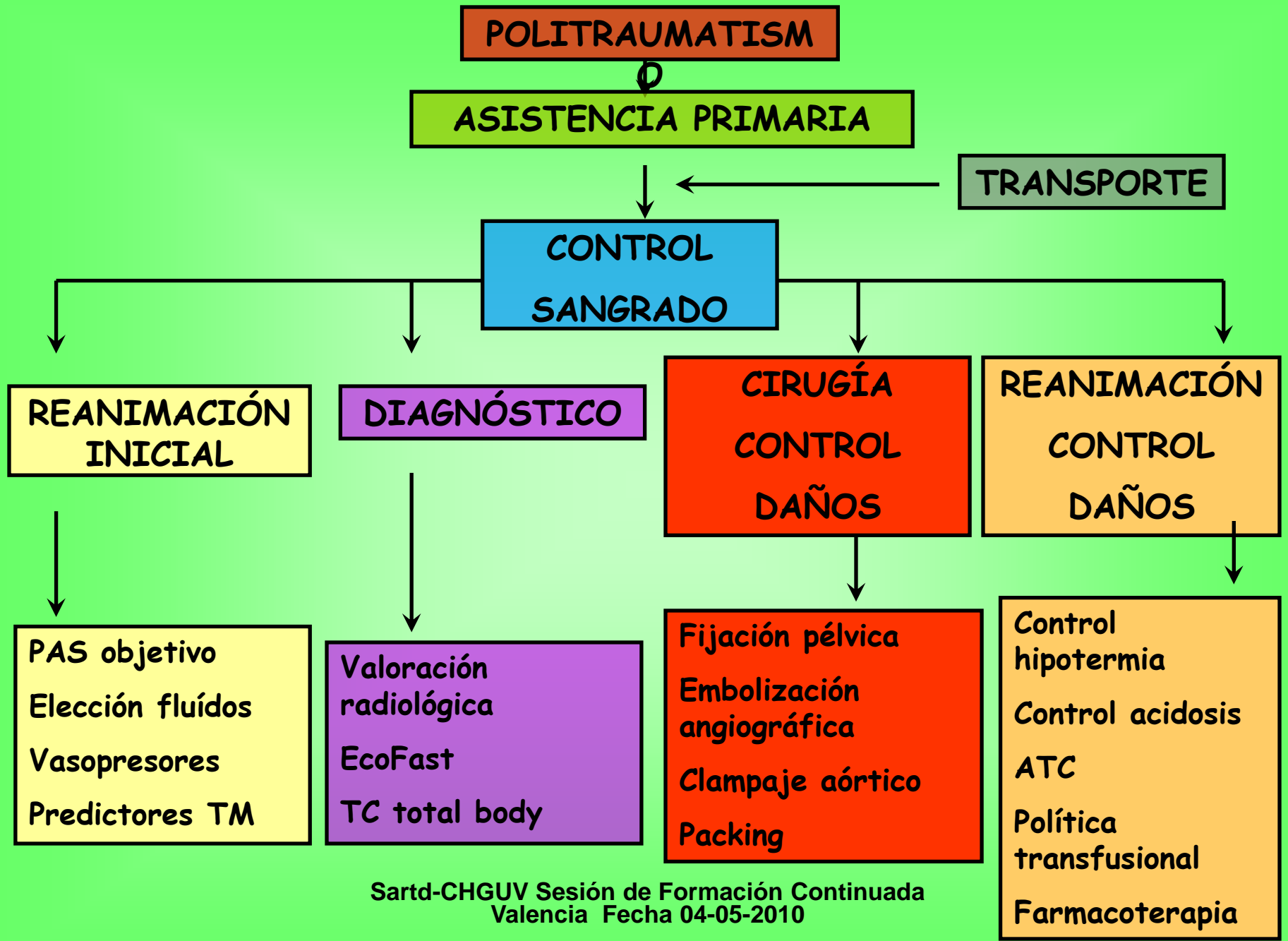
AVANCES EN FARMACOTERAPIA

CONCENTRADO COMPLEJO PROTROMBÍNICO



Recommendation 29

We recommend the use of prothrombin complex concentrate for the emergency reversal of vitamin K-dependent oral anticoagulants. (Grade 1B).



POLITRAUMATISM

ASISTENCIA PRIMARIA

TRANSPORTE

CONTROL SANGRADO

REANIMACIÓN INICIAL

DIAGNÓSTICO

CIRUGÍA CONTROL DAÑOS

REANIMACIÓN CONTROL DAÑOS

PAS objetivo
Elección flúidos
Vasopresores
Predictores TM

Valoración radiológica
EcoFast
TC total body

Fijación pélvica
Embolización angiográfica
Clampaje aórtico
Packing

Control hipotermia
Control acidosis
ATC
Política transfusional
Farmacoterapia

**GRACIAS POR VUESTRA
ATENCIÓN !!!!!**

