

DSTC™

DEFINITIVE SURGICAL TRAUMA CARE

IATSIC - INTERNATIONAL ASSOCIATION FOR TRAUMA SURGERY AND INTENSIVE CARE
NATIONAL DSTC STEERING COMMITTEE
ALTEC - ASSOCIAÇÃO LUSITANA DE TRAUMA E EMERGÊNCIA CIRÚRGICA

CENTRO DE SAÚDE MILITAR DE COIMBRA – ex HOSPITAL MILITAR DE COIMBRA

Rua Vandelli, 3030-405

40°12'12"N 08°25'12"W

COIMBRA – PORTUGAL

2017 DECEMBER 05-07

**COURSE DIRECTOR: CARLOS MESQUITA
CO-DIRECTOR: HENRIQUE ALEXANDRINO**

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International Association for Trauma Surgery and Intensive Care



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CENTRO DE SAÚDE MILITAR DE COIMBRA – ex HOSPITAL MILITAR DE COIMBRA

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The **Definitive Surgical Trauma Care (DSTC™)** course is developed under the auspices of the **International Association for Trauma Surgery and Intensive Care (IATSIC)** and established worldwide in Europe, South Africa, Australasia, Asia and North and South America. It is currently the most advanced trauma course available internationally. It boasts a high faculty to participant ratio, the faculty consisting of experienced trauma surgeons.

The DSTC is an intensive course comprising lectures, interactive case discussions and surgical simulation, designed to teach qualified surgeons and advanced surgical trainees strategic thinking and decision-making in the management of the severely injured patients and to provide them with practical surgical skills for major organ injuries.

This course in Coimbra will be limited to 24 participants but an extra number of doctors having done it before will be accepted for a Refresher Course that includes, only, the lectures and case presentations.

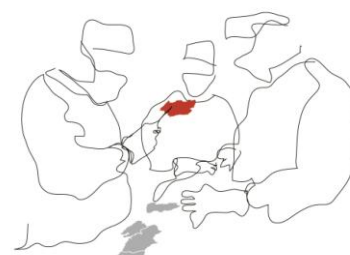
Normal Course Fee	1000 €
Refresher Normal Course Fee (for previous DSTC course participants)	0250 €

These fees include, as 3rd day activities, the Trauma & Emergency Surgery Symposium (TESS).

Any cancellation or replacement must be conveyed to the organizer in writing. A cancellation charge of 50% of fee will be levied if the cancellation is received during the month before the scheduled course date.

The organizer reserves the right to cancel the course and fully refund the participants should unforeseen circumstances necessitate it.

A **DATC (Definitive Anaesthetic Trauma Care)** course, for anesthetists, and a **DPNTC (Definitive Perioperative Nursing Trauma Care)** course, for nurses, may take place simultaneously.



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CENTRO DE SAÚDE MILITAR DE COIMBRA
CENTRO DE SIMULAÇÃO

CURSO DE CIRURGIA DE TRAUMA, 05 A 07 DE DEZEMBRO DE 2017

DEFINITIVE SURGICAL TRAUMA CARE (DSTC™) COURSE

NORMAS PARA SIMULAÇÃO CIRÚRGICA EM MODELO ANIMAL, NOS TERMOS DA LEGISLAÇÃO EM VIGOR (Directiva 2010/63/EU do Parlamento Europeu):

1. O curso decorrerá no Centro de Simulação do Centro de Saúde Militar de Coimbra.
2. Traduzir-se-á num real e óbvio benefício para os cirurgiões, anestesistas e enfermeiros participantes, em termos de desenvolvimento das respectivas capacidades técnicas.
3. Não existe, no momento, alternativa concreta, tendo em vista os superiores objectivos do curso.
4. O curso não tem fins lucrativos e rodear-se-á de total transparência no tocante aos seus aspectos financeiros.
5. Só serão utilizados animais criados para abate, regra geral suínos – em casos de objecção, por motivos religiosos, poderão, também, ser utilizados caprinos –, os quais terão de ser fornecidos em tempo útil e rigorosamente inspecionados pelo médico veterinário no momento da entrega.
6. Os animais não serão submetidos a procedimentos que lhes causem dor, sofrimento, aflição ou dano duradouro.
7. Só serão utilizados animais mortos ou completamente anestesiados que não recuperarão a consciência após a anestesia. Em última análise, todos os procedimentos propostos poderão ser classificados como treino em animal vivo completamente anestesiado que não recuperará a consciência.
8. Independentemente do seu grau de qualificação específica, todo o pessoal envolvido actuará sob a supervisão de médicos veterinários.
9. Os médicos veterinários terão sempre a última palavra, podendo interromper os procedimentos em curso desde que o entendam necessário.
10. É pressuposto o total respeito pelas normas legais, éticas e científicas aplicáveis.

SURGICAL SKILLS – LABORATORY USE AND CARE OF ANIMALS FOR ETHICS COMMITTEE APPROVAL

1. The programme will take place in the Simulation Center of Centro de Saúde Militar de Coimbra.
2. There is clear and obvious benefit to the participant surgeons, anaesthesiologists and nurses in terms of developing their skills.
3. There is no better alternative available and the course is part of a graded process involving a number of other approaches.
4. The course is not run primarily for commercial benefit (profit) either to the organizers of the course or to any commercial entity involved with the course. The financial aspects will be transparent and subject to full disclosure.
5. The animals will be swines or goats undergoing creation and will be ordered timeously and inspected when they arrive.
6. The animals will not be submitted to procedures that may cause them pain, suffering, distress or lasting harm.
7. All proposed experiments may be classified as experiments on living animals that are completely anaesthetized and will not regain consciousness. Only dead or fully anaesthetized animals which do not recover from the anaesthesia will be used in the course.
8. The personnel who care for animals and investigators and co-workers are appropriately qualified, as veterinarians and medical doctors with research skills or under supervision.
9. The veterinarians have ultimate authority over the clinical care of animals, and can withdraw any animal from an experiment at any time for clinical reasons.
10. All proposed experiments comply with ethical, legal and scientific practices.

Coimbra, 8 de Agosto de 2017

O Diretor do Centro de Saúde Militar de Coimbra

O Responsável pela Equipa Veterinária,

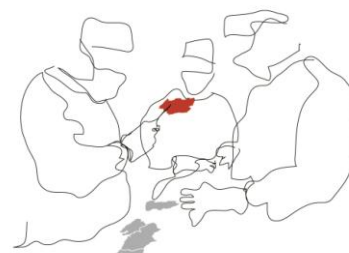
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International Association for Trauma Surgery and Intensive Care

O Responsável pelo Centro de Simulação,

O Director do Curso,
**ALTEC - Associação Lusitana
de Trauma e Emergência Cirúrgica**
Com. N.º 507 538 382

Sede: R. Fernando Pessoa, 7 - 1º
3000-170 COIMBRA



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Certificate of authorisation for DSTC™ Course

The following course has been authorised:

Country	Portugal			
City	Coimbra			
Venue	Hospital Militar de Coimbra, Centro de Simulação, Coimbra, Portugal			
Dates	From	12/5/2017	To	12/7/2017
Course Director(s)	Carlos Mesquita			
	mesquita.carlos@sapo.pt			
Course Coordinator(s)	Henrique Alexandrino			
	halexandrino123@gmail.com			
Course number	351 / 19			

Zurich, 18.09.2017

Ken D. Boffard
For DSTC™ Sub Committee

Chris Storz
for IATSIC Secretariat

IATSIC / DSTC Secretariat, Seefeldstrasse 88, CH-8008 Zurich, Switzerland
Phone: +41 44 533 76 50 / Fax: +41 44 533 76 59 / e-mail: surgery@iss-sic.com / webpage: www.iatsic.org



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FOREIGN TEACHERS	
Amauri Rocha	Maceió, AL - Brasil
Gustavo Fraga	Campinas, SP - Brasil
Jonathan Tilsed	Hull, England
Louis Riddez (IF)	Stockholm, Sweden
Nenad Teufel	Koprivnica, Croatia
Per Ortenwall	Gothenburg, Sweden
Piotr Koleda	Wroclaw, Poland
Sizenando Starling	Belo Horizonte, MG - Brasil
NATIONAL TEACHERS AND OTHER COLLABORATORS	
Ana Pereira (nurse, DPNTC)	Coimbra
André Fonseca (veterinarian)	Exército
António Gandra (NF)	Coimbra
Carlos Mesquita (IF)	Coimbra
Eládio Cardoso (nurse)	Coimbra
Filipa Madeira (anesthetist, DATC)	Coimbra
Gonçalo Paixão (veterinarian)	Exército
Hélio Oliveira (veterinarian)	Aveiro
Henrique Alexandrino (NF)	Coimbra
Hugo Santos (veterinarian)	Coimbra
Jorge Pereira (IF)	Viseu
Jorge Pimenta (veterinarian)	Lisboa
Lara Marcelo (anesthetist, DATC)	Porto
Liliana Lourenço (nurse, DPNTC)	Coimbra
Luís Ferreira (NF)	Dublin, Ireland
Luís Filipe Pinheiro (IF)	Viseu
Luís Vale (anesthetist, DATC)	Funchal
Paula Pereira (anesthetist, DATC)	Coimbra
Pedro Pessa (veterinarian)	Coimbra
Ricardo Duarte (anesthetist, DATC)	Funchal
Rita Resende (anesthetist, DATC)	Matosinhos
Sérgio Batista (anesthetist, DATC)	Abrantes
Tina Sanai (NF)	Faro



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Day 0 2017 December 04, Monday

1700 – 1850

DSTC / DATC / DPNTC Faculty only

1600 – 1645

DSTC / DATC / DPNTC National Steering Committees meetings

1645 – 1730

DSTC / DATC / DPNTC pre-course faculty meetings

1930 – 2230

Dinner Session

DSTC / DATC / DPNTC Faculty only

Day I

2017 December 05, Tuesday

0730 – 1300

DSTC / DATC all Participants

0730 – 0750

Registration

0750 – 0800

Welcome and introduction

Carlos Mesquita

0800 – 0830

Course overview / Surgical decision making

Louis Riddez

0830 – 0850

Case presentation 01

Louis Riddez

0850 – 0930

Damage control

Luís Filipe Pinheiro

0930 – 0950

Pediatric trauma

Piotr Koleda

0950 – 1030

Trauma laparotomy

Sizenando Starling

1030 – 1050

Morning tea

1050 – 1110

Case Presentation 16.1

Gustavo Fraga

1110 – 1150

Liver trauma

Henrique Alexandrino

1150 – 1210

Case Presentation 29

Per Ortenwall

1210 – 1240

Pancreatic and duodenal trauma

Gustavo Fraga

1240 – 1300

Case Presentation 31

Jonathan Tilsed

1300 – 1420

Lunch

1420 – 1700

DSTC all Participants

1420 – 1440

Case Presentation 30

Nenad Teufel

1440 – 1510

Splenic trauma

Amauri Rocha

1510 – 1550

Genito-urinary trauma

Jonathan Tilsed

1550 – 1610

Case Presentation 34

Sizenando Starling

1610 – 1700

Pelvic trauma

Nenad Teufel

1700 – 1800

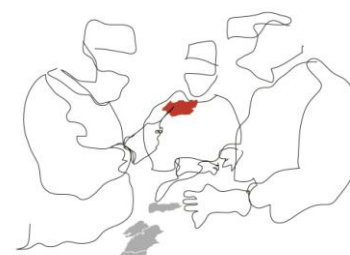
X EITCE 2017 Opening Session

DSTC / DATC / DPNTC Courses – Joint program

1930 – 2230

Dinner Session

DSTC / DATC / DPNTC Faculty only



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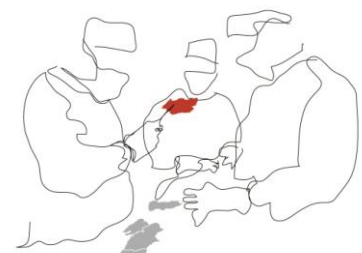
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Day II **2017 December 06, Wednesday**

0750 – 1900		DSTC all Participants	
0750 – 0800	Questions and Answers		
0800 – 0820	Case Presentation 07	Jorge Pereira	
0820 – 0855	Cervicomedial trauma	Jorge Pereira	
0855 – 0915	Case Presentation 14	Carlos Mesquita	
0915 – 1000	Thoracic trauma / Cardiac / Lung repair	Carlos Mesquita	
1000 – 1020	Case Presentation 08	Luís Filipe Pinheiro	
1020 – 1040	Surgical skills: ethics & briefing	Pedro Pessa	
1040 – 1100	Morning tea – move to skills laboratory		
	Group A	Group B	
1100 - 1345	Animal Laboratory 4 tables	Workshops	
		1100 – 1130	Extremity trauma Piotr Koleda
		1130 – 1200	Skeletal fixation Nenad Teufel
		1200 – 1230	Fasciotomy Per Ortenwall
		1230 – 1245	Break
1245 – 1345	Gunshot wounds António Gandra / Sizenando Starling		
1345 – 1445	Lunch		
	Group B		Group A
1445 - 1730	Workshops		Animal Laboratory 4 tables
	1445 – 1515	Extremity trauma Luís Filipe Pinheiro	
	1515 – 1545	Skeletal Fixation Nenad Teufel	
	1545 – 1615	Fasciotomy Louis Riddez	
	1615 – 1630	Break	
1630 – 1730	Gunshot wounds António Gandra / Amauri Rocha		
1730 – 1800	Move from skills laboratory / Afternoon tea		
1930 – 2230	Dinner Session	DSTC / DATC / DPNTC Courses – Joint program	



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Skills lab. - Grouping of Participants

GROUP A: 12 participants

Table 1	Table 2
Louis Riddez / Luís Ferreira	Jorge Pereira / Amauri Rocha

Table 3	Table 4
Luís Filipe Pinheiro / Jonathan Tilsed	Henrique Alexandrino / Gustavo Fraga

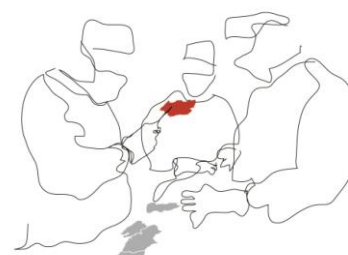
Auxiliary Faculty (between tables): Carlos Mesquita, Tina Sanai

GROUP B: 12 participants

Table 1	Table 2
Per Ortenwall / Tina Sanai	Jorge Pereira / Gustavo Fraga

Table 3	Table 4
Carlos Mesquita / Piotr Koleda	Henrique Alexandrino / Sizenando Starling

Auxiliary Faculty (between tables): Jonathan Tilsed, Luís Ferreira
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Day III 2017 December 07, Thursday UNIVERSITY HOSPITAL (HUC-CHUC)

0800 – 1300 Session I JOINT PROGRAM WITH TESS

0800 – 0850 2nd look at poster and oral presentations from other meetings

0850 – 0900 Questions and Answers

0900 – 0930 Massive haemorrhage

Louis Riddez

0930 – 1000 Fluid Resuscitation

Per Örténwall

1000 – 1030 Abdominal compartment syndrome

Jonathan Tilsed

1030 – 1100 Morning tea

1100 – 1120 Case Presentation 15

Henrique Alexandrino

1120 – 1140 Endpoints in resuscitation

Sérgio Batista

1140 – 1200 Case Presentation 16.2

Carlos Mesquita

1200 – 1300 Input regarding DSTC course / MCQ

1300 – 1420 Lunch

1420 – 1700 Session II JOINT PROGRAM WITH TESS

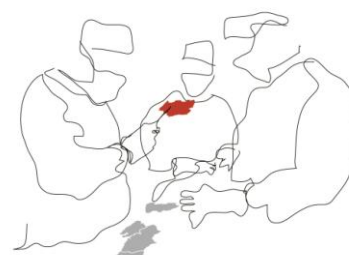
1700 – 1800 Session III Presentation of Certificates X EITCE 2017 Closing Session



COIMBRA UNIVERSITY AND DOWNTOWN

www.youtube.com/watch?v=2x-F-cwo_y4

Coimbra is one of the most important urban centers of Portugal and plays a role as the chief city of the central part of the country. Over 430.000 inhabitants live in the Metropolitan Area of Coimbra, made of 16 municipalities, comprising a 3372 km² territory. It is the district seat of Coimbra district, which belongs to the larger Centro region – the heart of ancient Lusitania – from whom it is the capital. The city, which has been the capital of Portugal during the 12th and 13th centuries, has the archeological remains from the Roman cities of Conimbriga and Aeminium. Coimbra developed into an important cultural centre, mainly because of the University of Coimbra, founded in 1290, and has notable monuments from that era and beyond. The university is one of the oldest in Europe. Due to its monumental buildings and history has been granted UNESCO World Heritage status and attracts tourists from around the world.



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OVERVIEW OF SURGICAL SKILLS

This lab uses live fully anaesthetised animals, pigs, to demonstrate definitive surgery and salvage (damage control) surgery techniques. There is an opportunity to exercise what has been taught earlier and operate on live animals with simulated injuries.

The lab starts with the 3-4 participants per animal doing a "trauma lap" supervised by instructors who accent the important differences between a trauma laparotomy for haemorrhage and an elective one for non-emergency problems. The instructors demonstrate the correct way to perform it, as well as illustrating the anatomical differences between the animal and the human. After the abdominal cavity has been opened and the procedures above demonstrated, the participants turn their backs and injuries are caused by the instructors. The participants return immediately to find and control the problem. They are instructed in rapid, damage control techniques and thought processes. This cycle is repeated after control of the injury has taken place.

The induced injuries start as rather minor, non-haemorrhagic intra-abdominal injuries, that progress in severity through the abdomen, then into the chest. The following is a list of injuries that are induced, the procedures done and the order in which they should be done. By starting in the abdomen and moving into the chest, gradually increasing the potential lethality, the animal does not expire early and the exercise can continue to cover all the suggested injuries. As noted below, some injuries can be induced and treated *post mortem* if the animal expires before the end of the session.

Each animal will have a veterinarian responsible for all aspects of anaesthesia. Please regard the procedure as if it were an event in your operating theatre working with the scrub nurses and the anaesthetists.

Start by performing the laparotomy, and demonstrating the following:

- The trauma laparotomy
- The anatomy of the pig abdomen

Thereafter, each injury is caused by the instructors using a combination of cutting, stabbing or crushing the tissue or organ between clamps. The aim is to allow each participant to perform all of or, at least, part of each surgical procedure.



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INJURY

Abdominal

Diaphragmatic laceration

Splenic injury

Gastric injury

Duodenal

Pancreatic injury

Small / large bowel injury

Renal injury

Ureteric injury

Biliary injury

Liver injury

Vena cava injury

Aorta or iliac artery injury

Abdominal closure

Pelvic

Pelvic injury

Thoracic

Cardiac stab wound (inflicted with a size 10 blade)

PROCEDURE

Suture repair

Mobilization / splenorrhaphy / splenectomy

Suture repair / lesser sac exploration

Suture repair / patch

Suture / staple distal pancreatectomy

Bowel ligation / suture

Nephrorrhaphy / wedge excision / nephrectomy

Ligation with delayed repair // stent / ureterostomy

Ligation / stenting

Blunt fracture of the liver and haemorrhage control

Hepatic vascular isolation

Control and repair techniques

Mobilisation and control of the retrohepatic cava

Control techniques

Damage control procedure

Temporary abdominal wall closure

Intra-abdominal pressure measurement

Intraperitoneal packing

Extraperitoneal packing

Subxiphoid window

Perform left antero-lateral thoracotomy

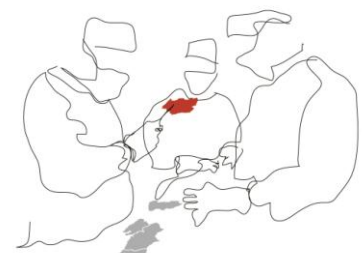
Proceed to median sternotomy

Perform cardiac repair

Proceed to clamshell incision

Perform tractotomy and lung repair

In order to minimise blood loss and keep the animal alive, it is probably best to save the aortic injury for the chest, at the end. IVC control and repair, however, is an important procedure to do while in the abdomen.



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NOTES ON ABOVE PROCEDURES

Bowel repair – Damage Control

Objectives

To use staples to demonstrate the technique of damage control resection or closure of multiple perforated segments of bowel (from bullet wounds or knife wounds). No attempt of anastomosis is required, although you may wish to demonstrate one, if time permits.

Procedural hints

It is simply to convey a principle, as all the surgeons should be familiar with staple gun usage anyway. Spend no more than 5–10 minutes on this section.

Diaphragmatic Injury

Objective

To show the group how to find and repair a diaphragmatic injury

Procedural hints

Time will not permit much time to be spent on repair of diaphragm injuries. You may wish to create a left sided diaphragm injury and have your group try and suture or staple this (if time allows). The repair of pulmonary lacerations can be discussed, but will be dealt with in the section on thoracic injury. Be careful not to lacerate the lung when you are making the diaphragmatic laceration. If so, leave a drain to prevent a tension pneumothorax.

Splenic Injury

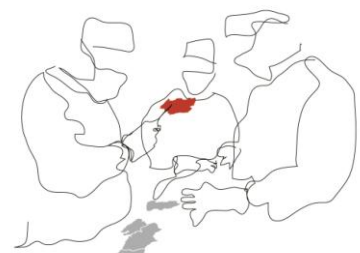
Objectives

To take the group through splenorrhaphy, partial splenectomy and full splenectomy techniques.

Procedural hints

In the pig, the spleen is long and easily accessed. There is one main vessel which runs along the length of the spleen. It can therefore be ligated along its length to facilitate partial splenectomy, rather than securing one or 2 or 3 segmental vessels. In the dog, there are segmental vessels to the spleen which are easily securable, to allow partial splenectomy. The pig spleen is so thin (as is the dog) that finger fracture techniques do not work well. Diathermy usage is preferential, with suturing to oversee the exposed surface. In a partial splenectomy, it is best to first secure the segmental vessels and then perform the splenectomy over Teflon pledgets.

Splenic repair can be demonstrated using the technique of suture placement through a #18 spinal needle which is then diathermised, and then sutures tied over pledgets. The use of topical agents can be discussed, but in this situation they are of less relevance. The rest of the spleen can then be lacerated in multiple sites (as in a fractured spleen from blunt trauma), and mesh used to wrap the fractured spleen together. Incise the mesh half way across, lay it behind the spleen, and wrap it forwards with a running suture from the hilum up and along the length of the spleen in a T-formation. Splenectomy can then be performed as a final procedure.



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Pancreatic injury

Objectives

This will involve some limited attention to the distal pancreas and involve discussion of different procedures that can be performed. The objective will be for the group to understand the limitations of distal pancreatectomy.

Procedural hints

There will not be enough time to take the group through all the procedures, such as pyloric exclusion, diverticularisation, or a Whipples. However, the group should be able to recognise an injury to the tail of the pancreas. They should attempt a damage control stapled distal resection, or oversew of the tail.

Renal injury

Objectives

To reinforce the principles of approaching retroperitoneal haematomas surgically. To emphasise proximal arterial control of the renal artery, the possibility of heminephrectomy, by segmental control of upper or lower pole vessels, and to perform nephrectomy.

Procedural hints

Incise or traumatise the kidney so that it provides a bleeding target for the participant group. Both kidneys can be dealt with if required. Ensure that the group can do a “fish-mouth” partial nephrectomy, as well as emphasising the techniques required for vessel and ureter repair in a total nephrectomy.

Liver injury

Objectives

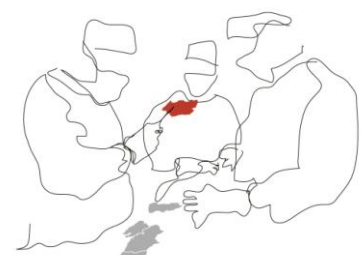
To familiarise the participants with packing and mobilisation techniques, tractotomy, and control of bleeding, finger fracture techniques for control of bleeding. Access to hepatic vein injuries can be discussed.

Procedural hints

Having first created a penetrating wound of liver, follow the sequence of liver packing, then mobilisation and haemorrhage control. Demonstrate vascular isolation including the Pringle’s manoeuvre. The procedure should be done while the liver is bleeding, so the participants get the feel of dealing with the emergent situation.

Liver packing

This should be taught as a specific manoeuvre during the animal station. Demonstrate this technique to control actual bleeding following injury. The emphasis is on limiting the amount of packs above the liver, particularly in retrocaval injuries where this can pull the liver away from the cava. There are differing schools of thought as to whether the liver should be fully mobilised in order to effectively pack it. Demonstrate packing without mobilisation, initially, then mobilise the liver.



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Liver mobilisation

Encircle the suprahepatic vena cava, below the diaphragm. Divide triangular ligaments and falciform ligament, so that liver is “hanging” from the hepatic veins and IVC. In the human, remember that there are some small direct branches from the IVC into the caudate lobe and some adrenal branches. In the pig, the IVC is intrahepatic.

Pull the liver across to the patient’s right, go through the lesser omentum and then push the oesophagus away to the left, find the right crus and sharp and blunt dissect the space to the right of the crus, where the IVC is. Put a gauze swab into this space pushing it behind the IVC, then replace the liver and swing it to the patient’s left, elevating the right lobe. Dissect in the space behind the IVC, to find the gauze swab coming from the left hand side. The spaces are then opened and the IVC encircled and controlled, after removing the gauze swab (the Daryl Wall Technique).

Hepatic isolation

Snugging or clamping the IVC above and below the liver, together with Pringle’s manoeuvre, gives a brief period of time of warm ischaemia of the liver. The problem with this is that the Pringle’s manoeuvre and IVC control, together with aortic input to the abdomen, leads to congestion of the bowel, and oedema. Therefore, control of the abdominal aorta at the same time as hepatic isolation, may be required.

Tractotomy, opening down to the penetrating wound track, is an important technique. Packing may need to be employed earlier or later. Partial hepatectomy can be performed with finger fracture. Again, packing may need to be employed at some time.

Retroperitoneal Exposure / Inferior vena cava

Objectives

To supplement the cadaver work, demonstration of the anatomy of the aorta and IVC should be made.

Procedural hints

Create a penetrating IVC injury and have the group control and repair it. Ideally the penetration should be through both front and back walls so that the group learns to repair the back wall from the inside, without damage to the lumbar veins.

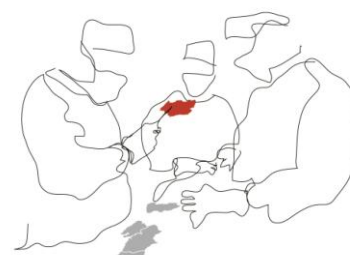
Shunts

Objectives

To demonstrate the use of shunts.

Procedural hints

For damage control in the abdomen, shunts should be practiced. The tubing used for the shunt should have a silk (or similar) tie around its middle with long ends, so that at the second look operation, the shunt can be found easily and withdrawn by pulling on this tie. The use of Rummell snares and snuggers to control vessels is less traumatic than arterial clamps, and should be taught as a part of the DSTC skill stations. This is particularly relevant in control of the liver with supra and infrahepatic IVC and Pringle’s manoeuvre.



DSTC™ - DEFINITIVE SURGICAL TRAUMA CARE

CENTRO DE SAÚDE MILITAR DE COIMBRA – ex HOSPITAL MILITAR DE COIMBRA

2017 DEZEMBRO 05-07

COURSE DIRECTOR: CARLOS MESQUITA
CO-DIRECTOR: HENRIQUE ALEXANDRINO

Damage Control

In the live animal segment, it is good to do a specific damage control technique towards the end of the station, with packing of the liver, shunting of a vessel, and multiple stapling and closure of bowel from multiple perforations. In this segment, practicing the closure techniques of the abdominal wall, using a Vacpac or Opsite® sandwich is useful.

Thoracotomy and cardiac repair

Objectives

To perform a left anterolateral thoracotomy and repair of a cardiac injury.

Procedural hints

With the beating heart on view, pericardotomy (craniocaudal, anterior to the phrenic nerve) should be performed. The instructor should then make a stab wound to the left ventricle, and take the participants through repair techniques, including direct digital pressure, and use of a clamped Foley balloon catheter. Both staples and suture over pledgets should be demonstrated. If the animal is alive at the beginning, hopefully this state can be maintained through this procedure, to the satisfaction of participants! Cross clamping of the descending aorta can be shown as a quick procedure. The course of the left subclavian artery should be shown.

Cardiac repair

The use of skin staple guns for quick efficient closure of cardiac penetrating wounds should be taught. This is a rapid closure technique which is followed with a definitive suturing technique, either together with removal of the staples, or even leaving the staples in situ. Pledgets should be used on the atria and right ventricle, which are thinner. The left ventricle can take sutures without pledgets.

Thoracic aorta repair

Objectives

To demonstrate the anatomy of the common site of disruption of the aorta in blunt deceleration injuries. If time permits, mimic such an injury and have the group control and repair this with direct suture.

Procedural hints

Air embolus

A small teaching segment needs to be developed within the surgical skills section on the prevention and management of air embolus in acute trauma surgery. Having the patient head-down on the table, and being aware of the risk of air embolus in venous injuries, is a good starting point. In pulmonary injuries, cross clamping of hilum of a damaged lung can prevent air embolus, where both venous and bronchial injuries co-exist. Definitive repair would then have to be undertaken, which would almost certainly involve staple resection of a pulmonary segment, or tractotomy of the lung, with repair or resection of affected bronchial and vascular segments. In cardiac repairs, thought needs to be given, at the end of repair, as to whether there is any air introduced into the heart chambers. Keeping the left atrium elevated on the hand, and aspirating from the apex of the left ventricle as the last manoeuvre, can remove this air.

