

Abdominal compartment syndrome: role of ultrasound

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**3rd LATIN AMERICAN COURSE ON
 PERIOPERATIVE ECHOCARDIOGRAPHY AND ULTRASOUND
 Bogota 2012**



Ultrasound and abdominal compartment syndrome: Can we cast the other tools aside yet?*

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Medicine
Northside Hospital Forsyth
Cumming, GA

Serial evaluations of patients at risk for IAH

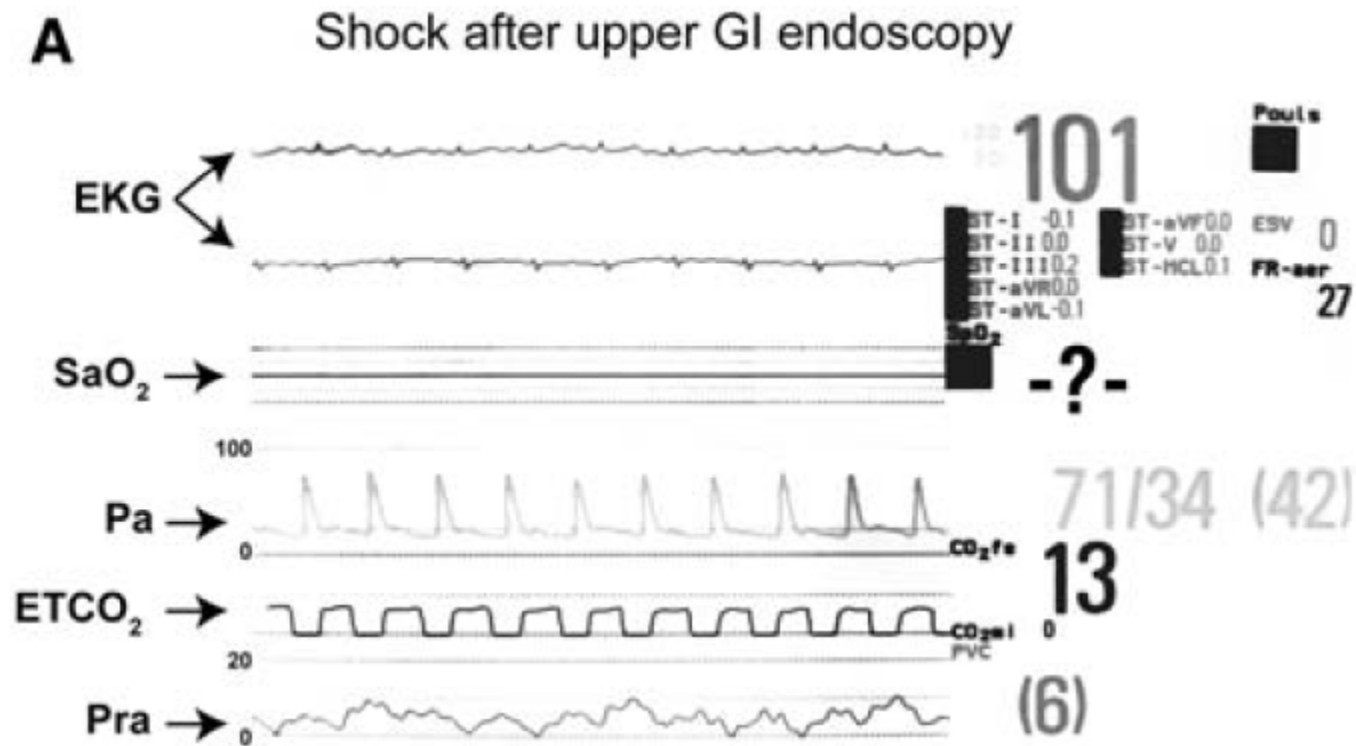
Patients at risk for developing deep venous thrombosis, pneumonia, pulmonary edema, and heart failure.

All of these applications have been well documented, are accurate in clinicians' hands, and currently practiced in intensive care units around the world.

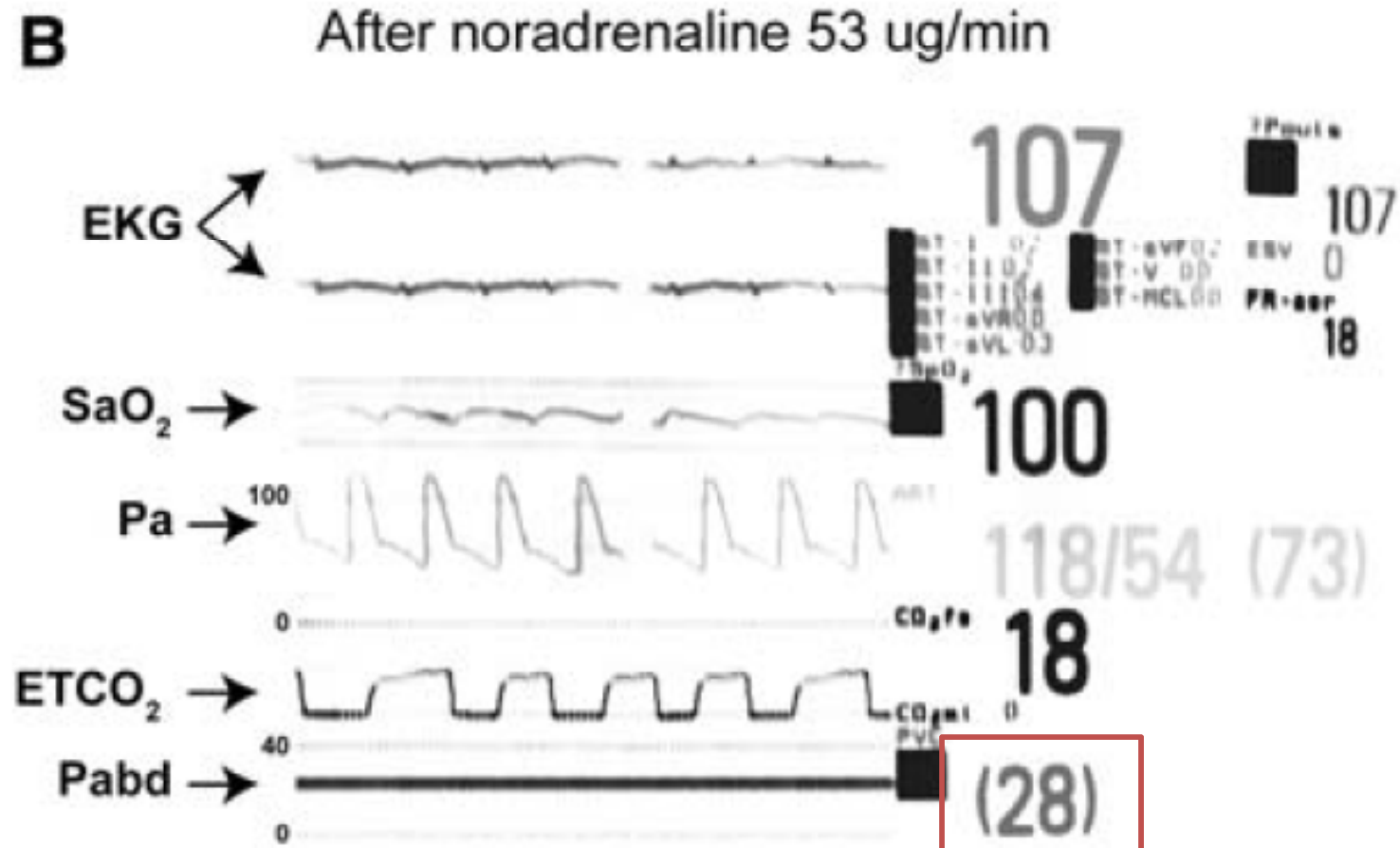
Role of ultrasound in IAH and ACS

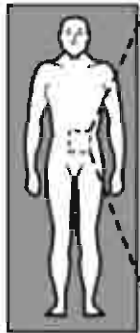
- Determine the etiology in the acute setting
 - Extraluminal > Intraluminal > parietal
- Evaluate the systemic impact
 - Brain
 - Heart
 - Lung
 - Abdomen: liver and kidney
- Guide therapy

57 yo ♂ with cirrhosis in shock
after UGI endoscopy

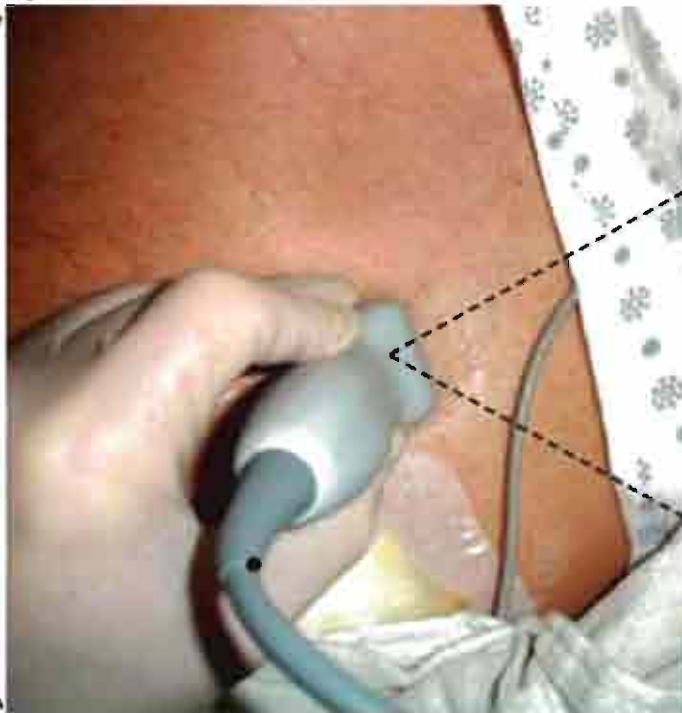


57 yo ♂ with cirrhosis in shock
after UGI endoscopy





A



10° medial tilt -->

10° lateral tilt -->

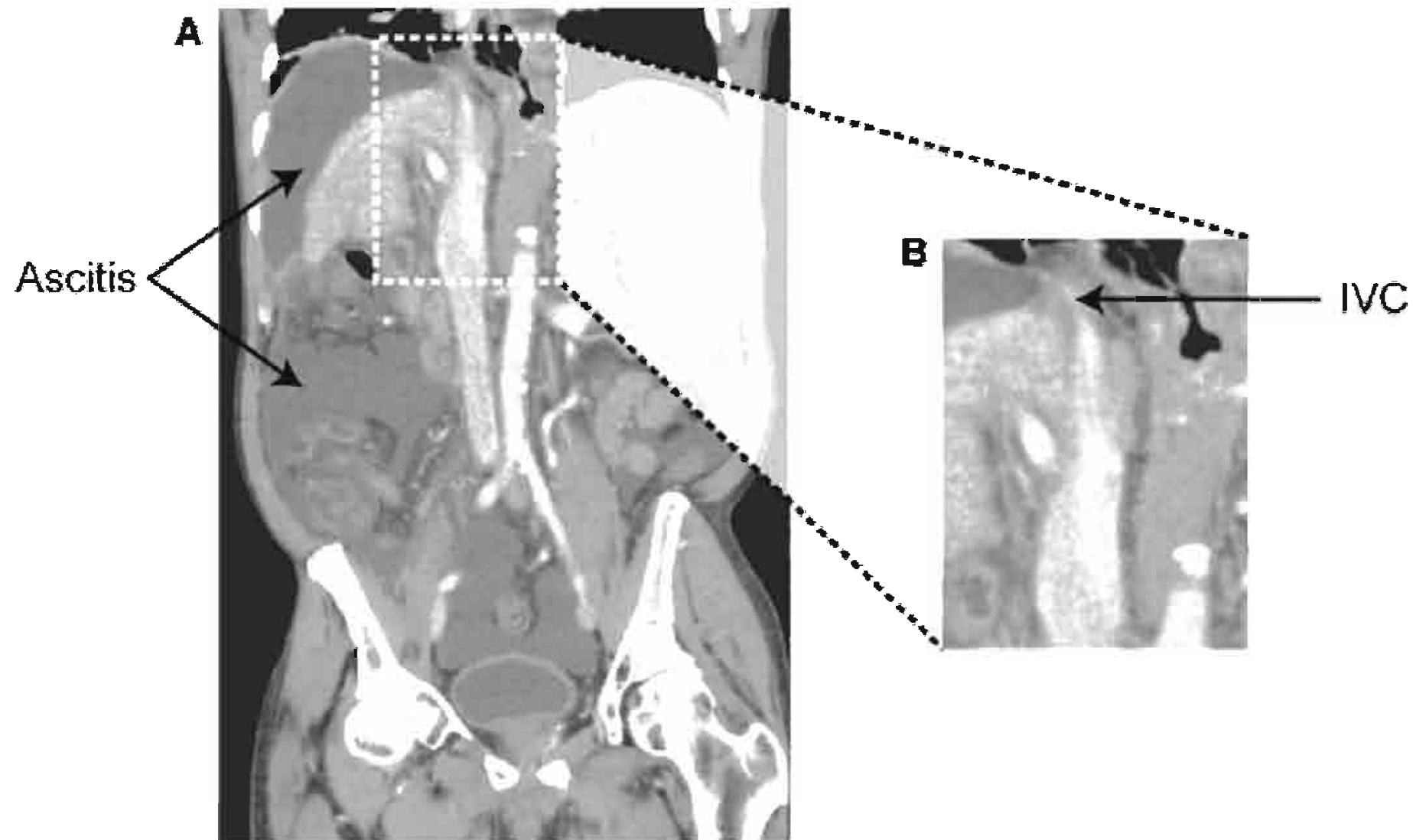
B

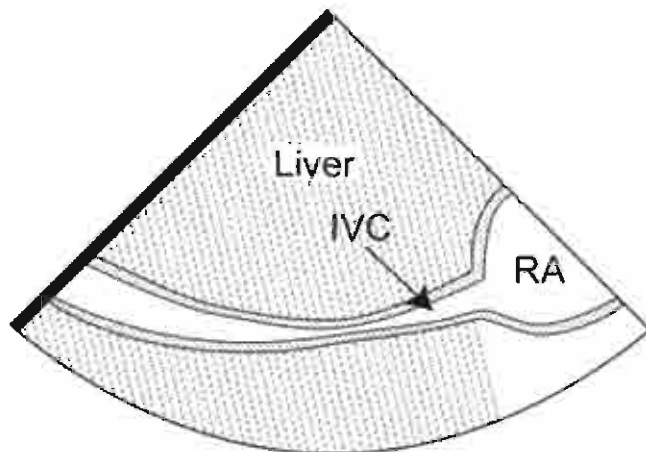


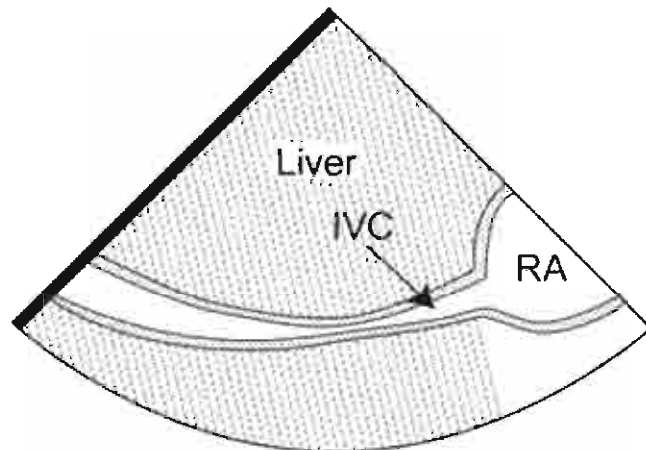
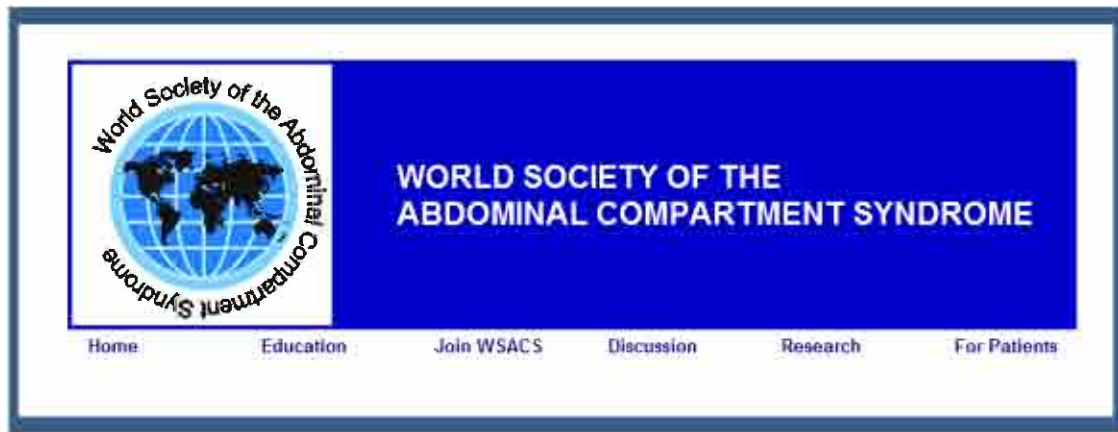
C











www.wsacs.org



The mission of the WSACS is to promote research, foster education, and improve the survival of patients with intra-abdominal hypertension (IAH) and/or abdominal compartment syndrome (ACS).

All who have an interest in the diagnosis, management, and/or treatment of IAH / ACS are invited to join the Society.

Can J Anesth/J Can Anesth (2009) 56:678–682

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PERIOPERATIVE CARDIOVASCULAR ROUNDS

Acute abdominal compartment syndrome

**Nancy Deslauriers, MD · Renée Déry, MD ·
André Denault, MD**

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Abdominal compartment syndrome

- A Impact in term of oxygenation
- B Impact in terms of ventilation
- C Significant circulatory impact
- D Diagnostic essential
- E Echography important role

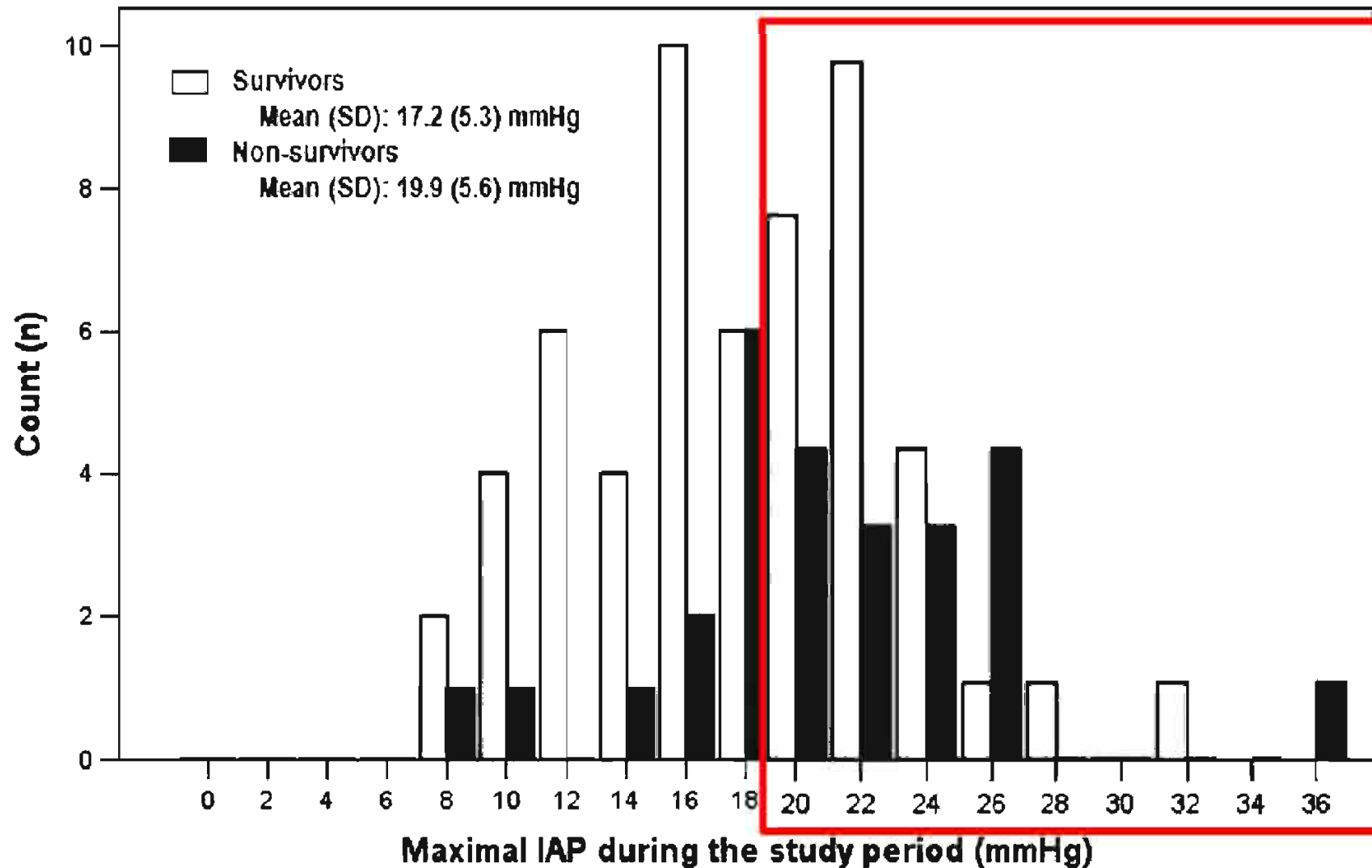
Intra-abdominal hypertension: Incidence and association with organ dysfunction during early septic shock

Tomas Regueira MD, Alejandro Bruhn MD, PhD, Pablo Hasbun MD, Marcia Aguirre MD, Carlos Romero MD, Osvaldo Llanos MD, Ricardo Castro MD, Guillermo Buggedo MD, Glenn Hernandez MD*

Department of Intensive Care Medicine, Pontificia Universidad Católica De Chile, Santiago, Chile

For the 72-hour study period, the cumulative incidence was **82.7%** (67/81 patients) for maximal intra-abdominal pressure values

Intra-abdominal hypertension: Incidence and association with organ dysfunction during early septic shock



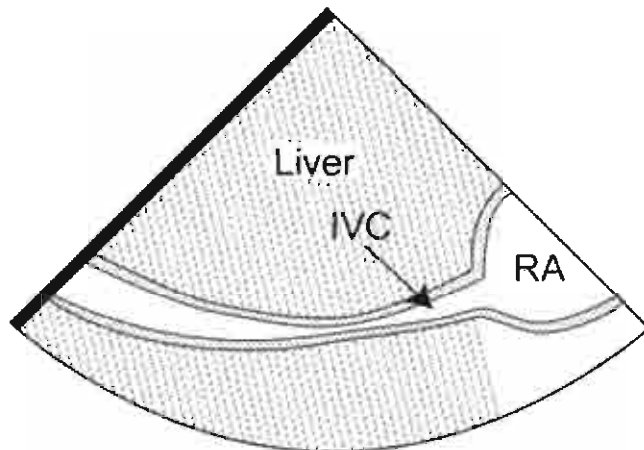
Intraoperative intra-abdominal pressures in cardiac surgery



191 patients recruited

IAP measured before and after surgery

IAH present in 55% before and 60% after surgery



Normal abdominal pressure

5-7 mmHg

Abdominal perfusion pressure

= Mean arterial pressure – abdominal pressure

50-60 mmHg

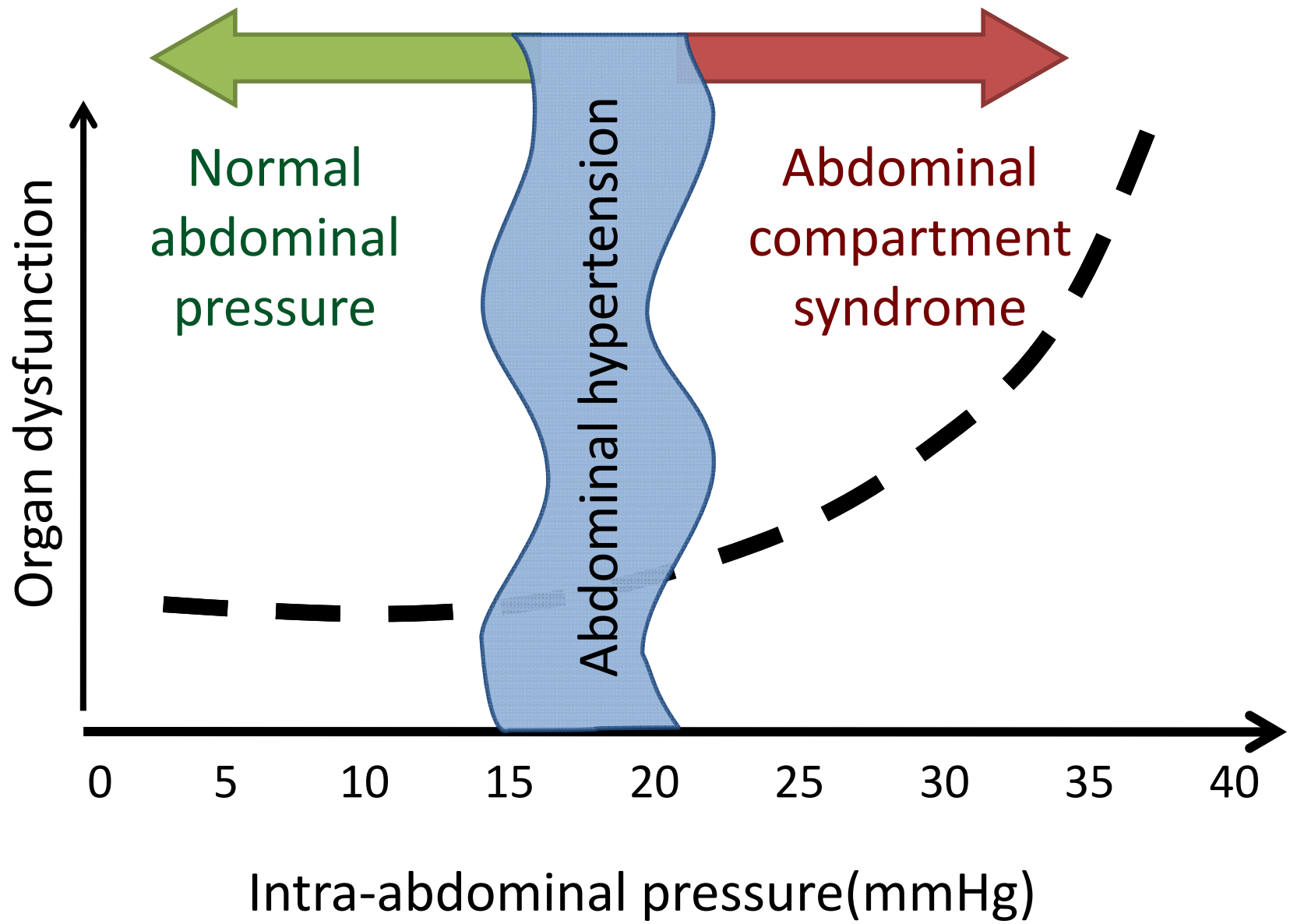
Abdominal hypertension

Abdominal pressure ≥ 12 mmHg
with 2 mesures at 4-6 hours interval



Abdominal compartment

- 1-Abdominal pressure > 20 mmHg
- 2- \pm Abdominal perfusion pressure < 60 mmHg
- 3-New organ dysfunction

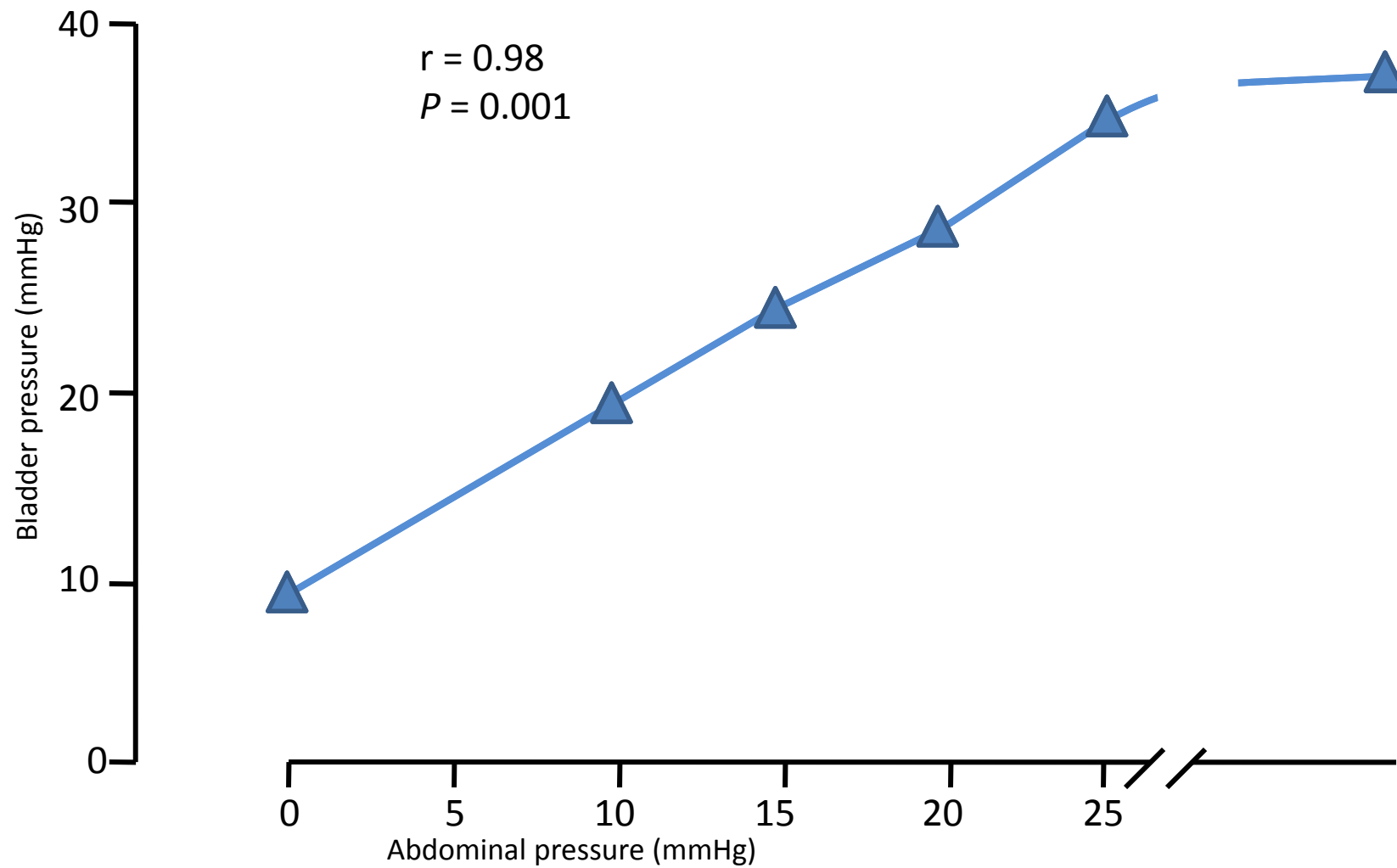


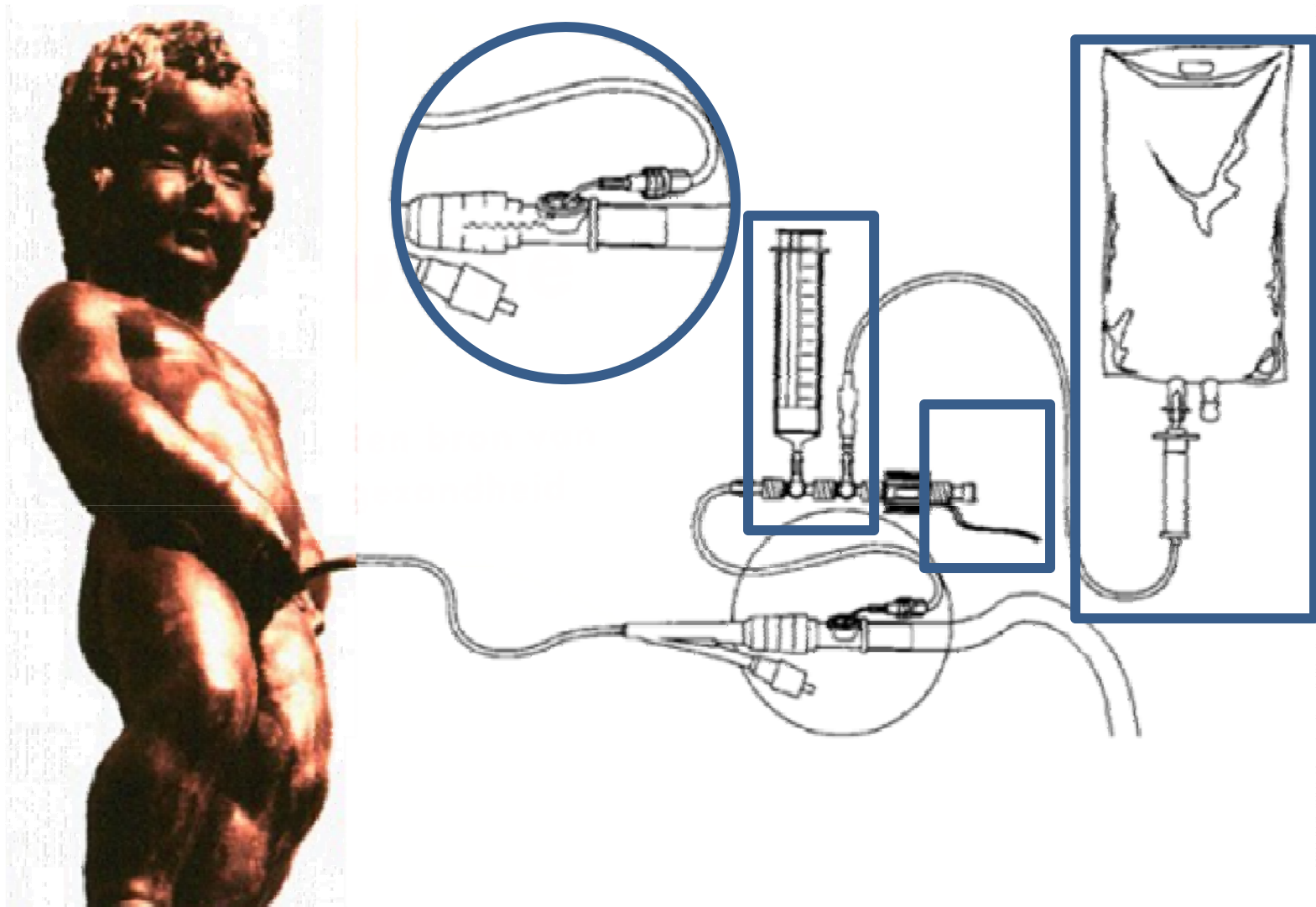
Physical examination



Measurement of abdominal pressure

Bladder pressure





Courtoisie de Paul Ouellet ;

Measurement of the intra-abdominal pressure



Measurement of the intra-abdominal pressure



High but why?

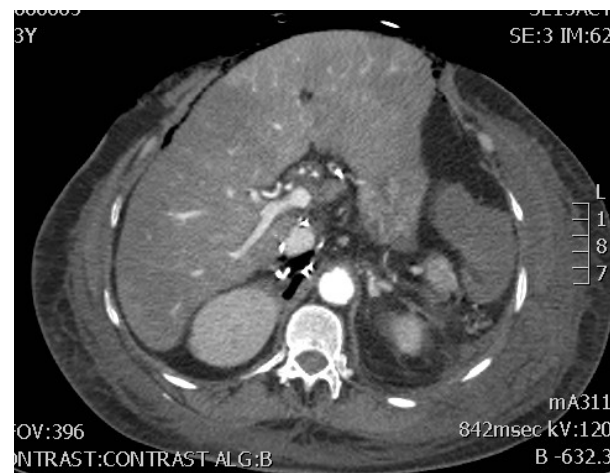
Intraluminal



Extraluminal



Parietal



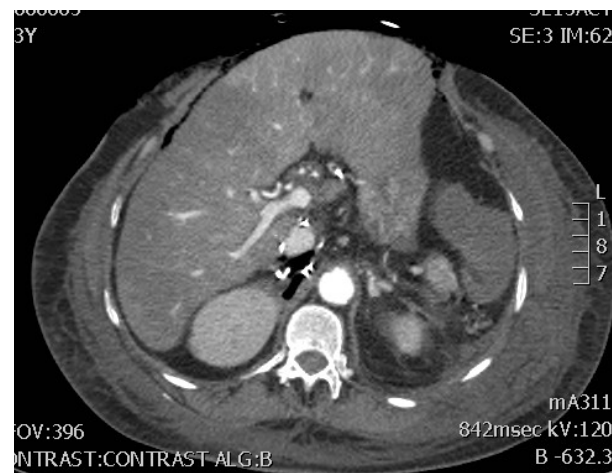
Intraluminal



Extraluminal



Parietal



June 2008

- Called for hypotension (75 mmHg) and abdominal pain in a 67 yo man with diabetes, atherosclerotic vascular disease and known for an abdominal aortic aneurysm
- Rushed in the ICU:
 - conscious and responding
 - SaO₂ = 100% HR 101
 - blood pressure in lower extremity = 120 mmHg

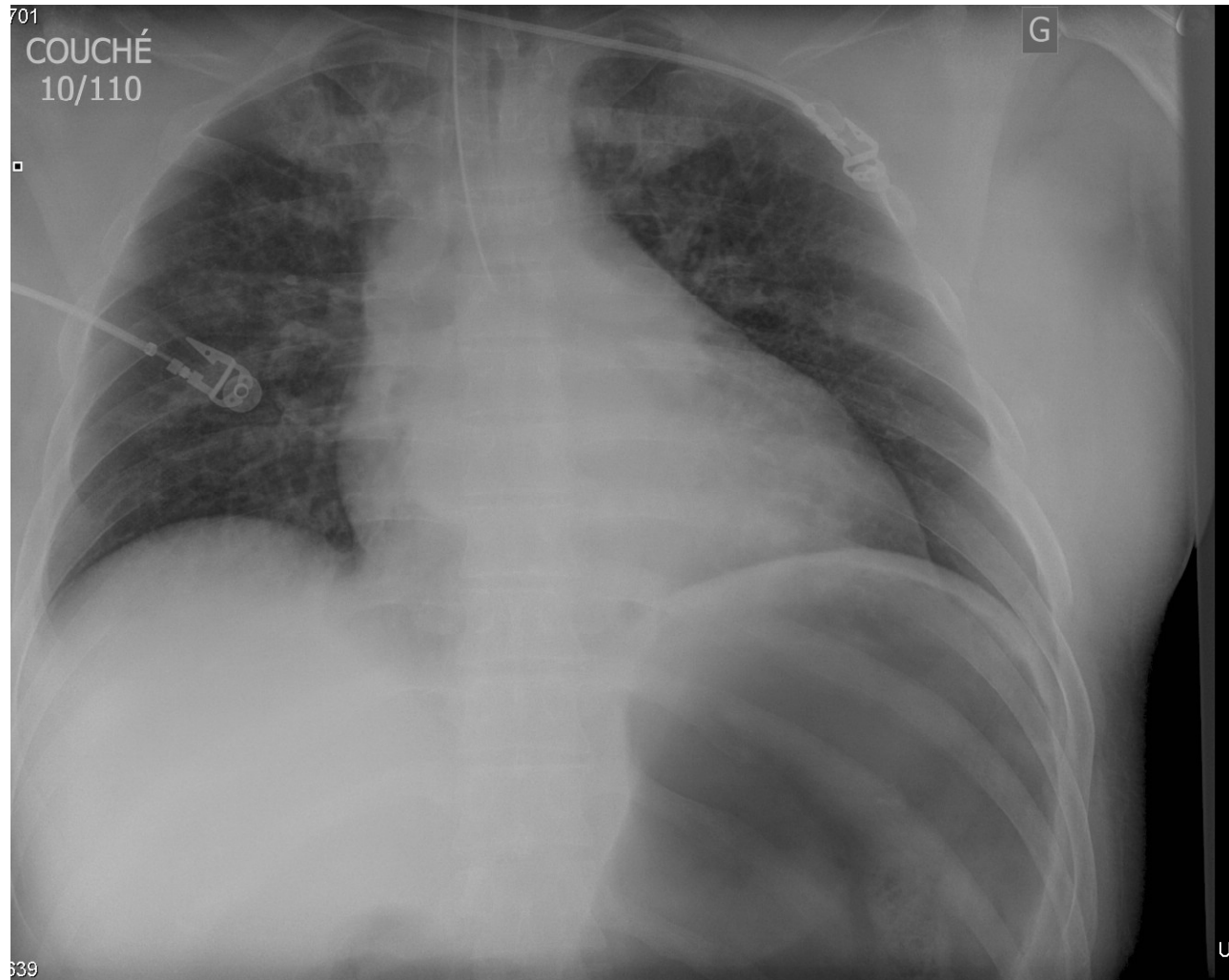




Second bag....



Severe hypotension after difficult intubation

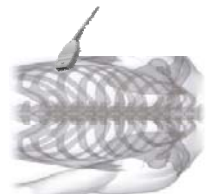


Intraoperative intra-abdominal pressures in cardiac surgery

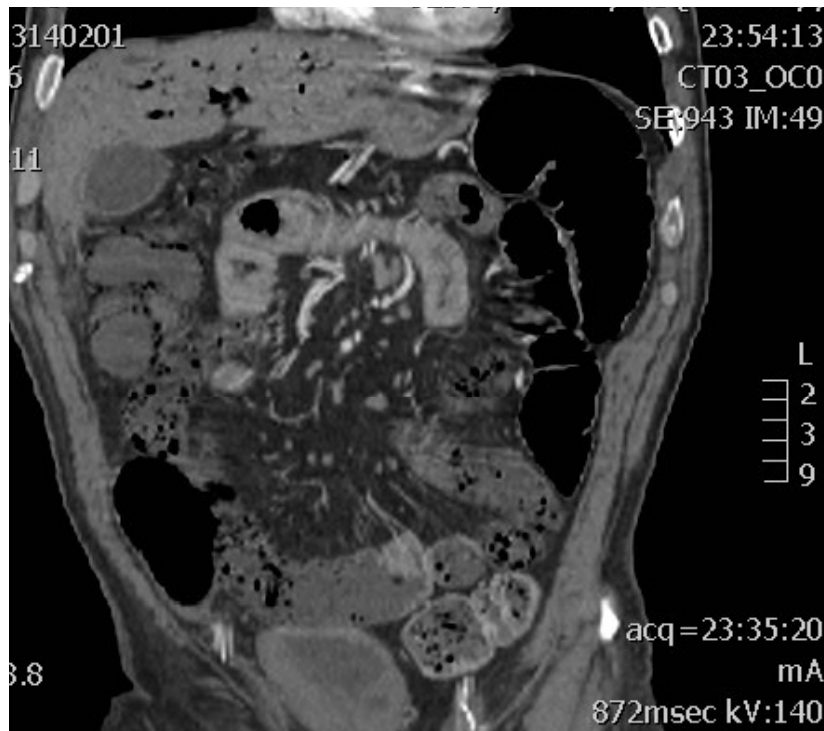


Reduction in IAP after surgery was associated with the use of a nasogastric tube ($p=0.0018$)

81 yo ♂ with hypotension and abdominal pain



81 yo ♂ with hypotension and
abdominal pain



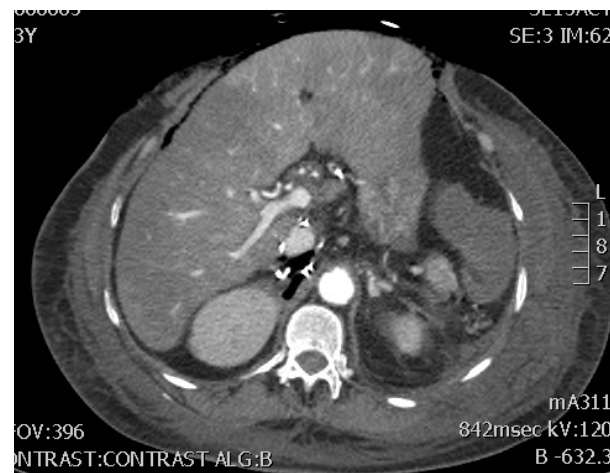
Intraluminal



Extraluminal

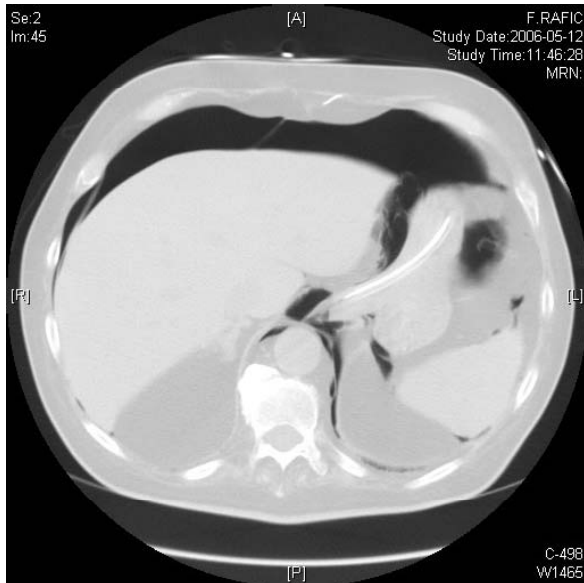


Parietal



Extraluminal

Air



Liquid



Liver point



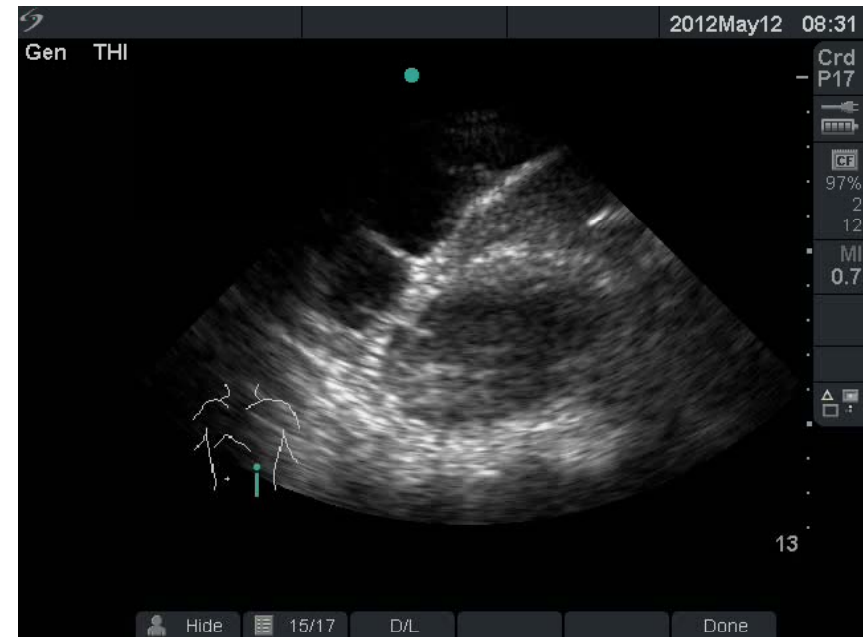
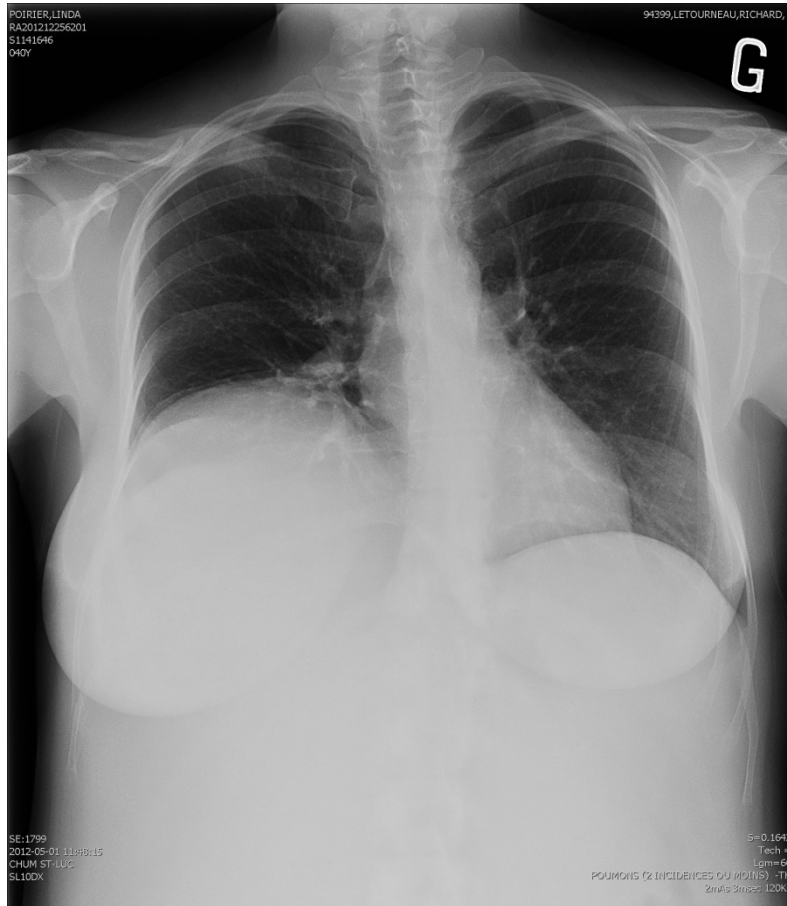
Liver



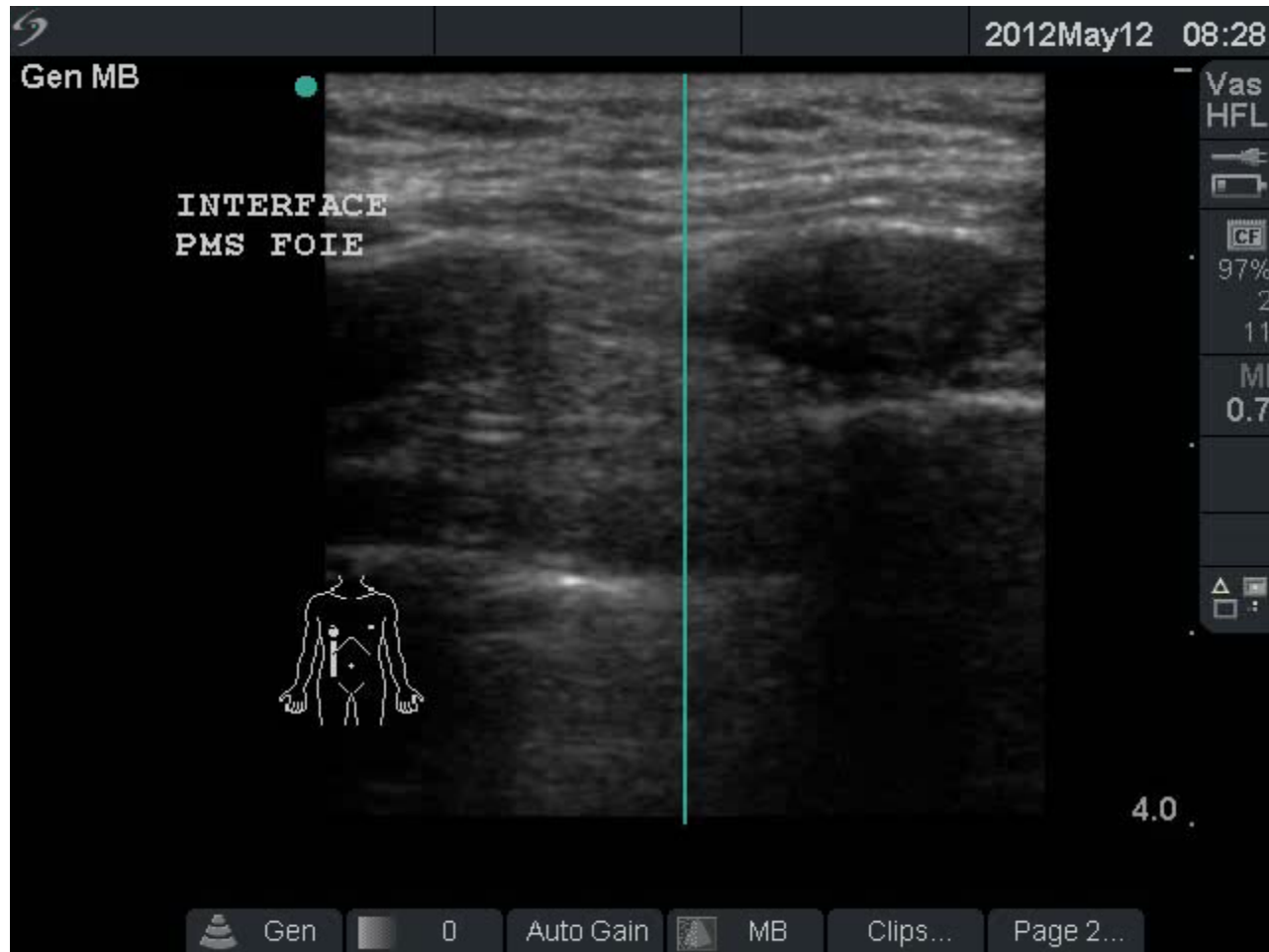
Lung



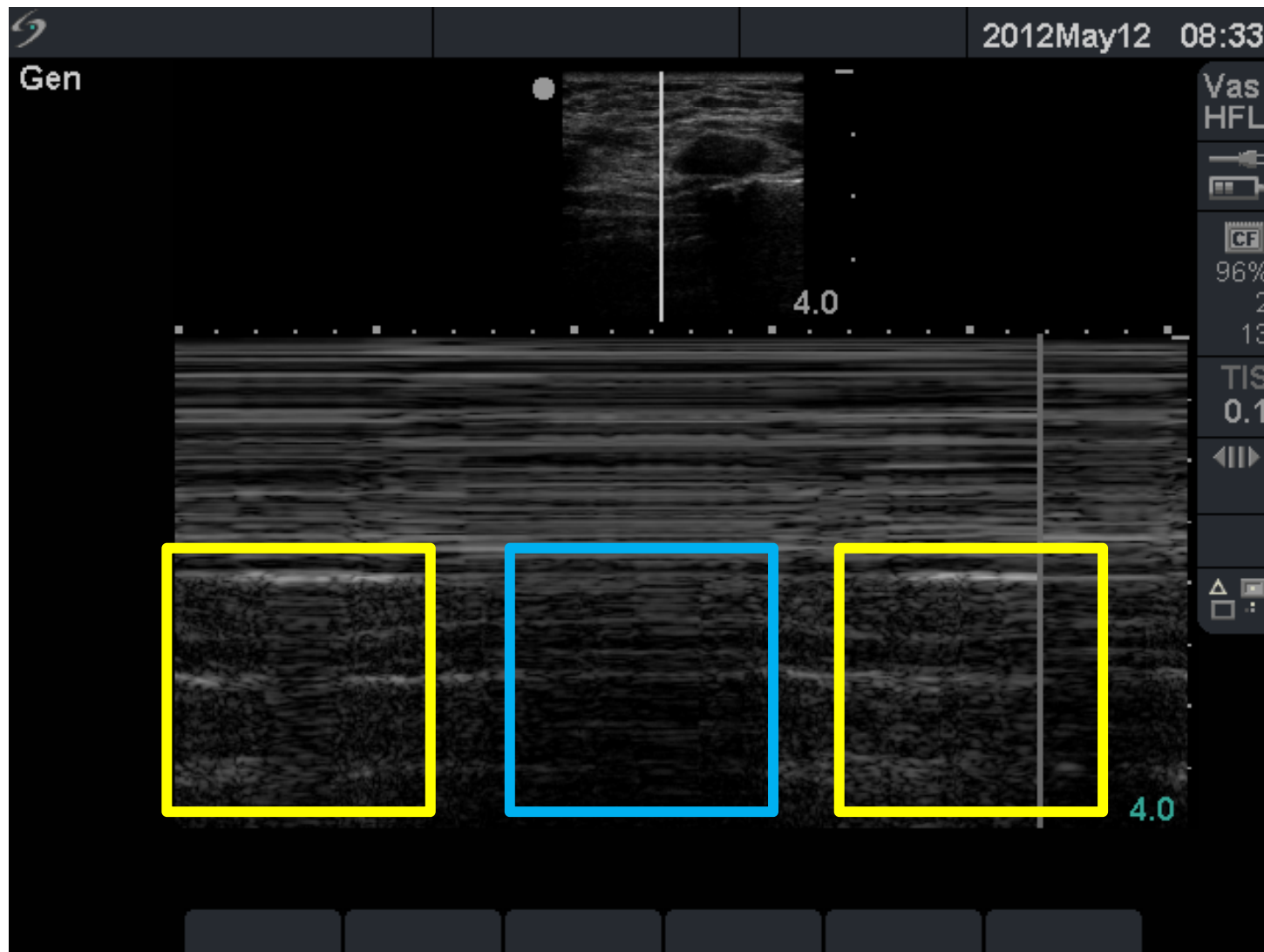
36 yo ♀ polykystic liver disease



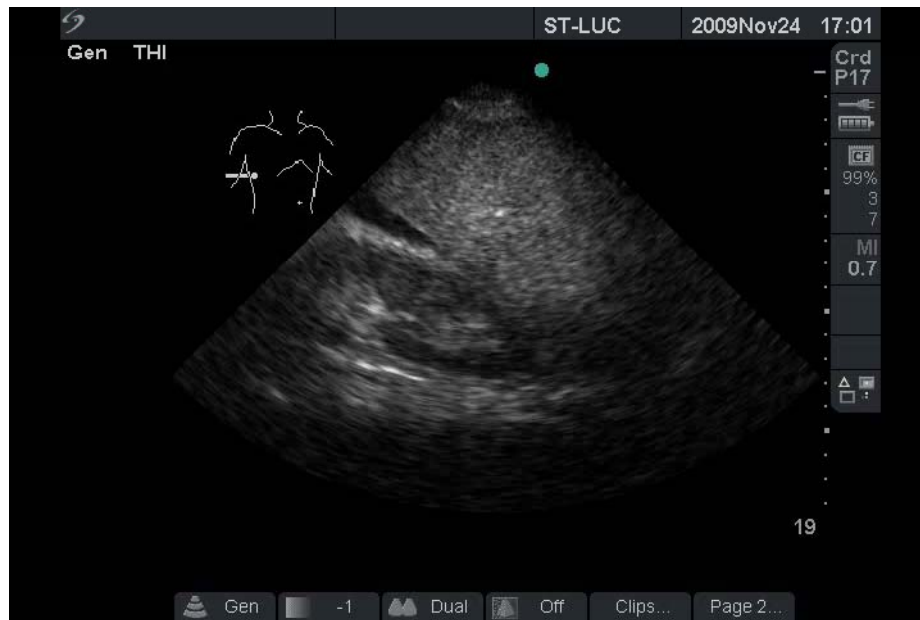
Post-operative exam



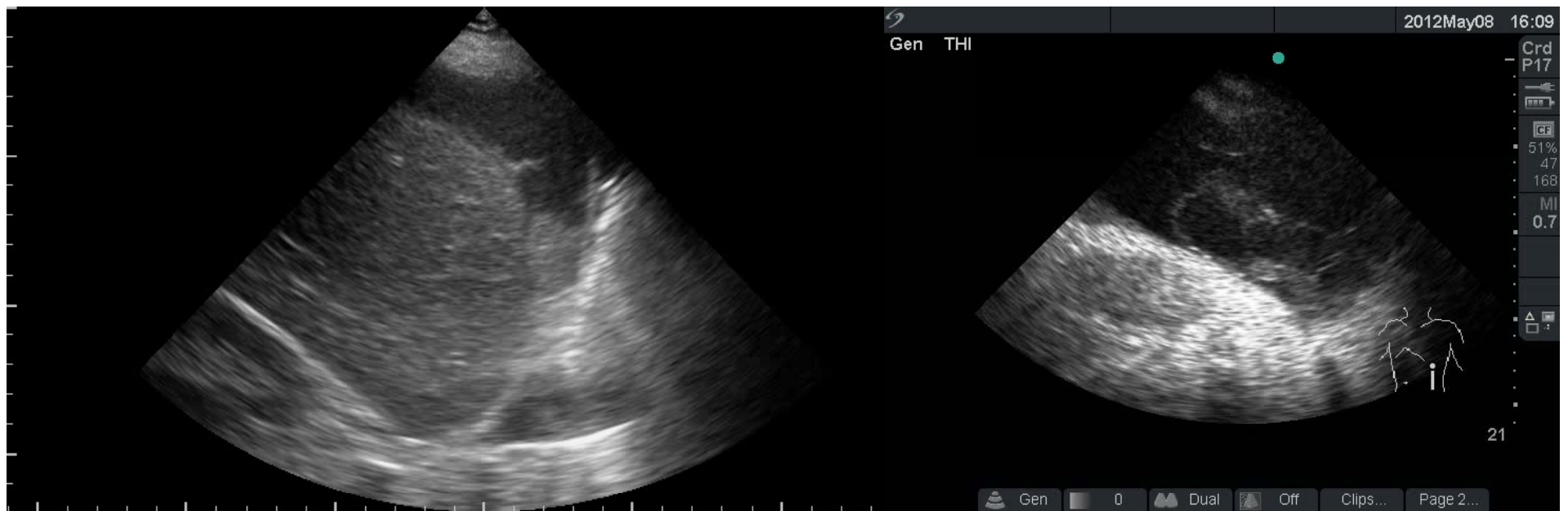
Post-operative exam



Simple fluid



Complex fluid



Curtesy of Philippe Rolla

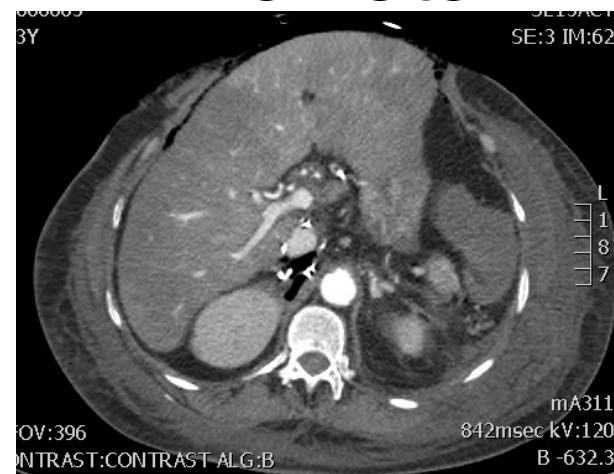
Intraluminal



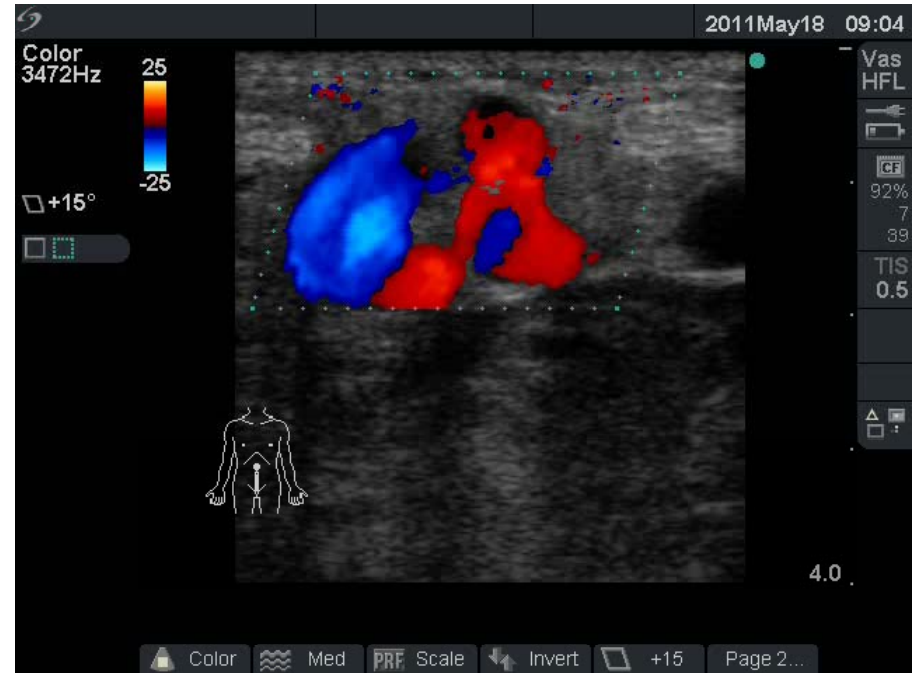
Extraluminal

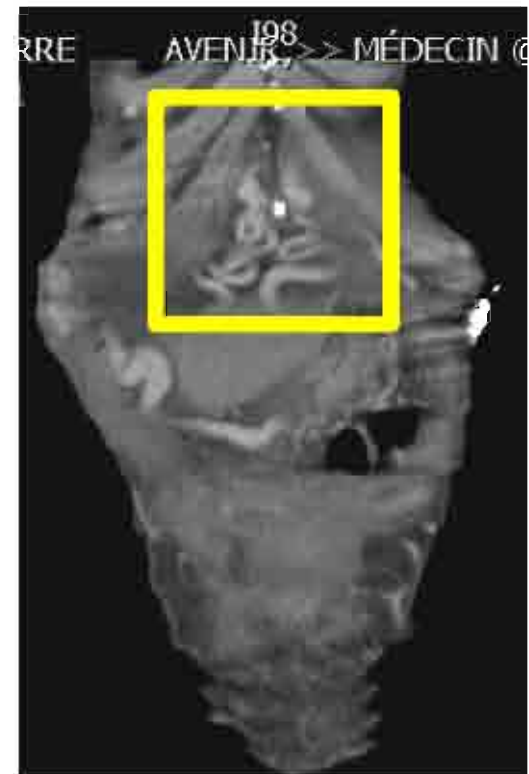


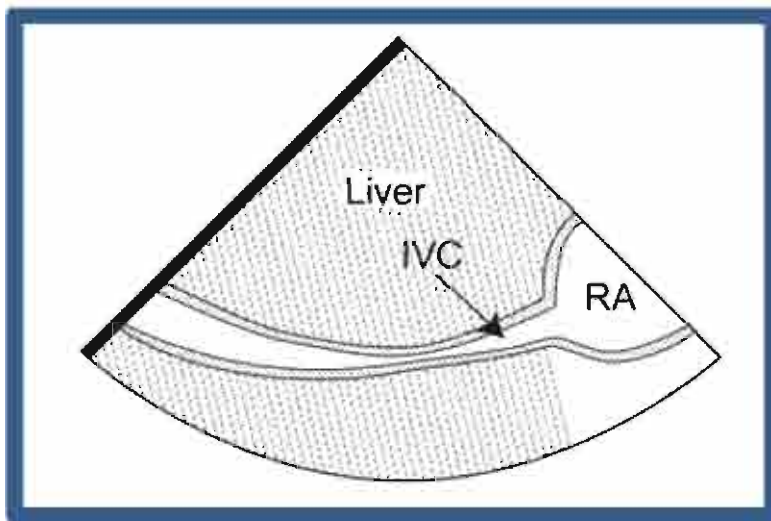
Parietal



55 yo ♂ with liver cirrhosis







Importance of the abdominal compartment syndrome

1890: abdominal pressure of 27-46 cm H₂O



Importance of the abdominal compartment syndrome

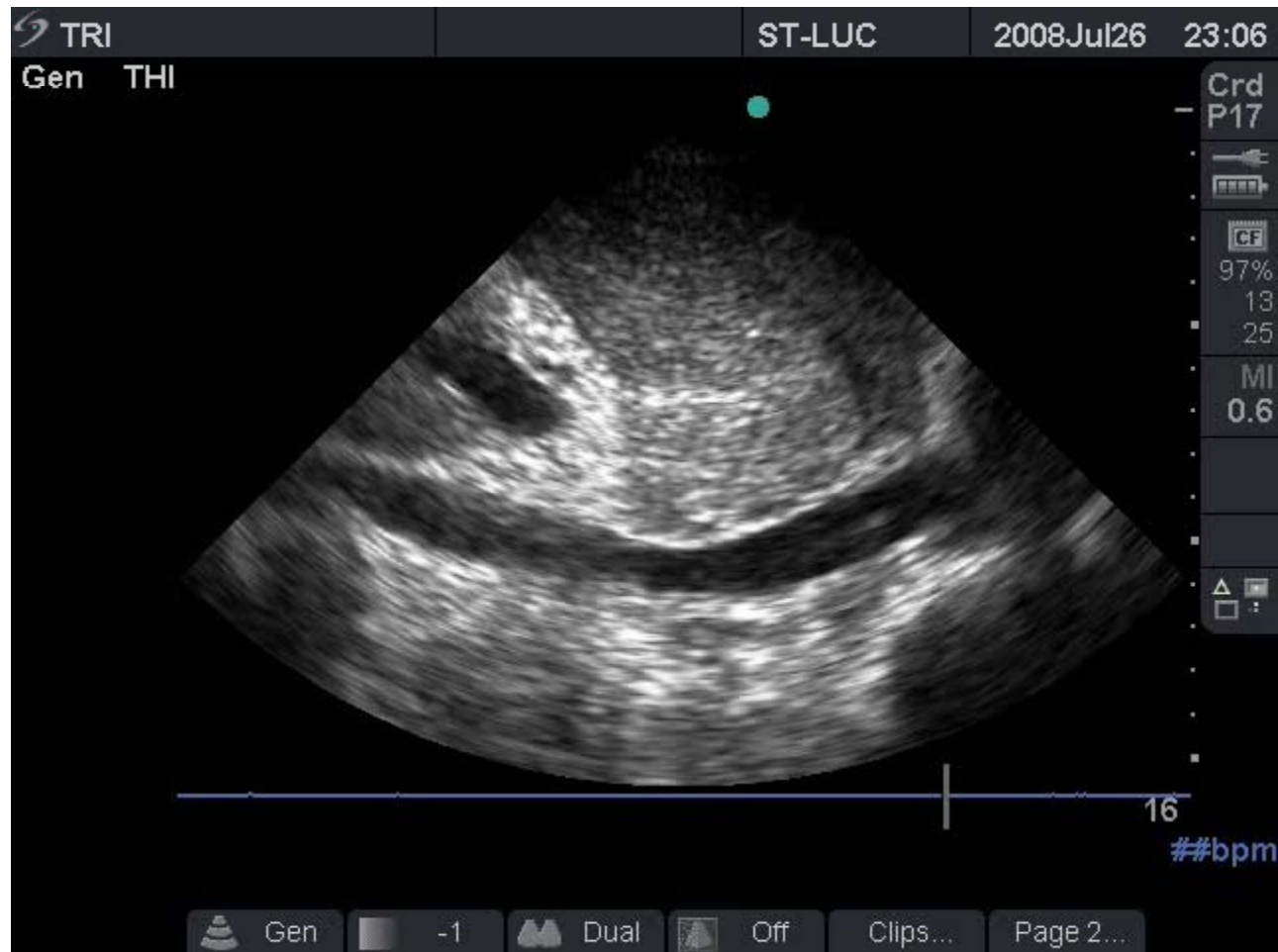
Increased abdominal pressure associated with:

1900	Respiratory compromise
1911	Cardiac dysfunction
1913	Renal dysfunction
1980	Splanchnic hypoperfusion
2009	Multisystem organ failure

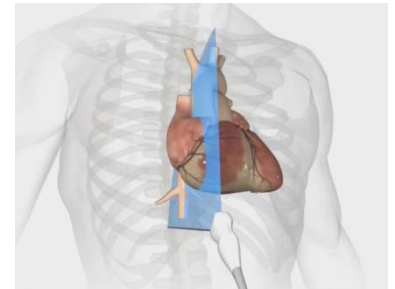
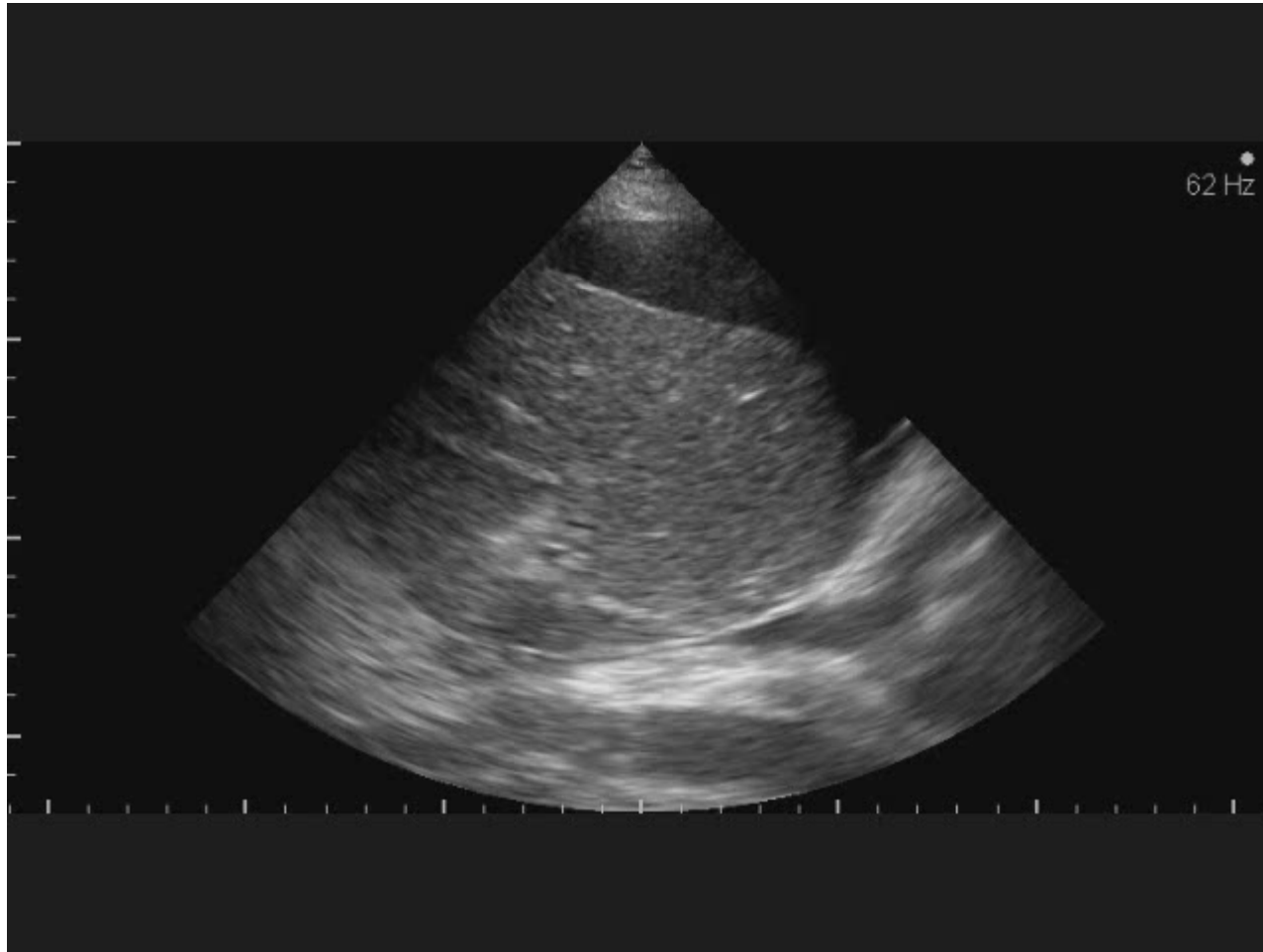
Focused Transesophageal Echocardiography
Overview of probe handling, orientation, anatomy and views
Heart orientation and position in chest



Reduced Pms

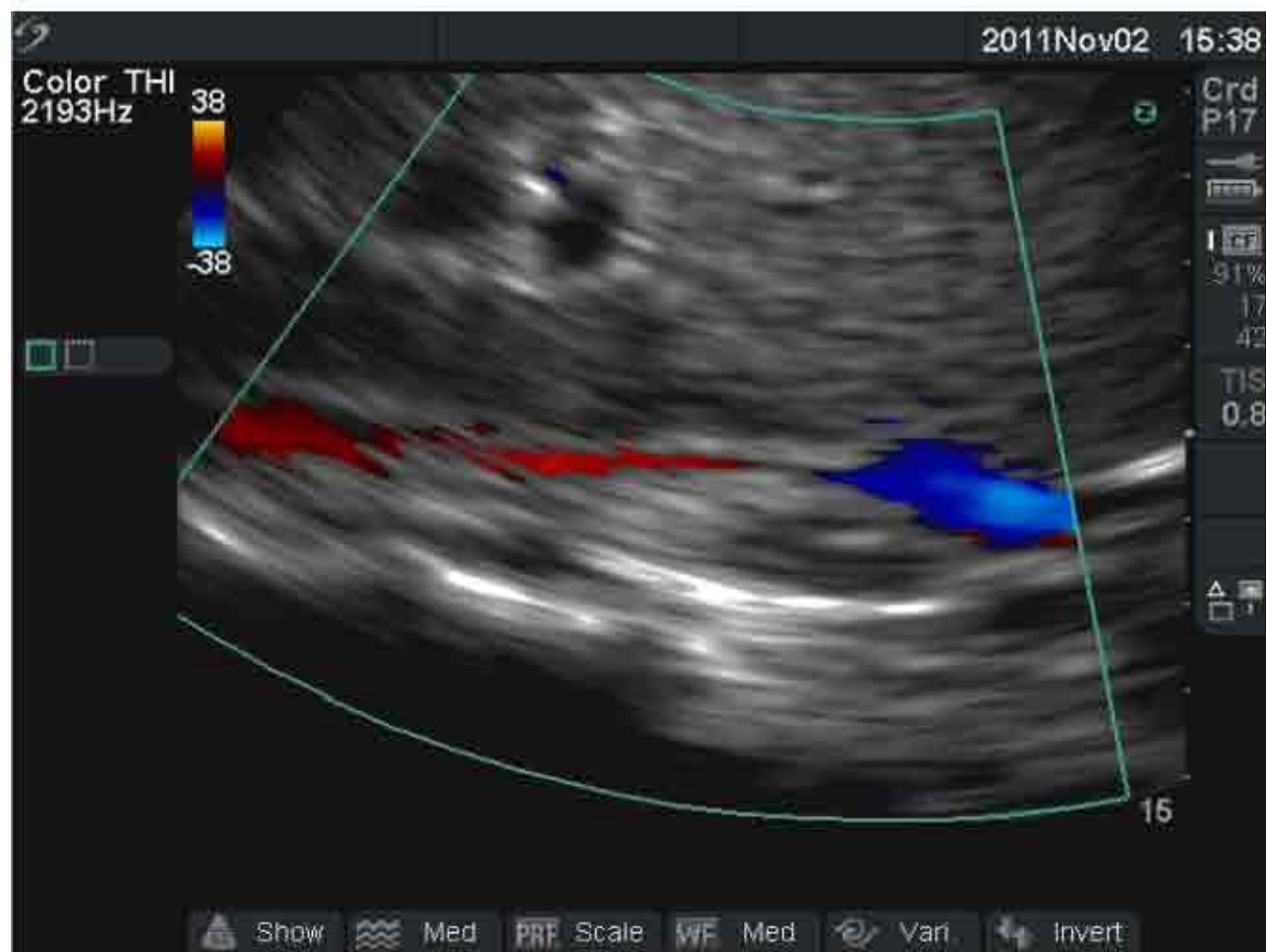


Reduced Pms or increased Rvr?



Curtesy of Philippe Rola





PICTORIAL REVIEW

A pictorial review of hypovolaemic shock in adults

¹A M TARRANT, MSc, FFR, RCSI, ¹M F RYAN, FFR, RCSI, ²P A HAMILTON, MD and ²O BENJAMINOV, MD

¹Department of Radiology, Cork University Hospital, Wilton, Cork, Ireland and ²Medical Imaging, Sunnybrook and Women's College Health Sciences Centre, University of Toronto, Ontario, Canada



Figure 4. Contrast-enhanced abdominal CT of a 25-year-old man. This demonstrates a narrow calibre inferior vena cava (black arrow). Bilateral pulmonary contusions are present. There is a significant volume of free intraperitoneal fluid.

65 ♂ yo with hepatic hematoma



Percutaneous Catheter Decompression in the Treatment of Elevated Intraabdominal Pressure

Michael L. Cheatham, MD; and Karen Safcsak, RN

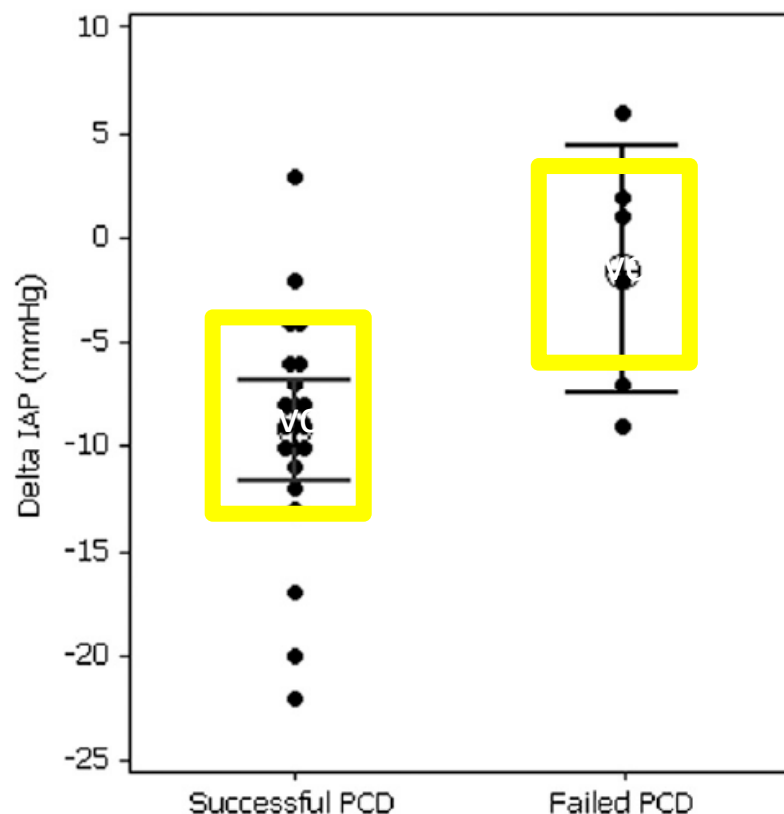


FIGURE 1. Change in IAP following PCD. The graph depicts the mean and 95% CI surrounding the change in IAP (delta IAP) over the first 4 h of PCD. IAP = intraabdominal pressure; PCD = percutaneous catheter decompression.

**Case control study of PCD in 31 patients (14F pigtail catheter)
81% success**

Failure to drain at least 1,000 mL of fluid and decrease IAP by at least 9 mm Hg in the first 4 h post decompression is associated with PCD failure and should prompt urgent OAD

Intra-abdominal pressure ≥ 20
 \pm new-onset organ dysfunction

Conclusion

- Intra-abdominal hypertension should be considered as a vital sign in any critically patients
- Bedside ultrasound can be useful in determining the etiology and systemic consequences of IAH and ACS.
- Percutaneous catheter decompression can be used in certain cases to reduce IAH



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Inhalothérapeute

Remerciements