LOW-BP

A Simple Approach To Beside Ultrasound Use In Undifferentiated Shock

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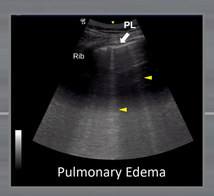

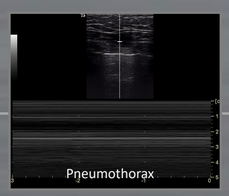

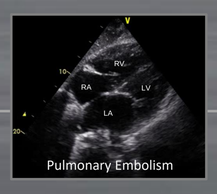

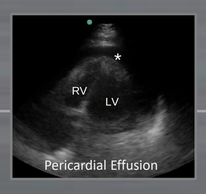

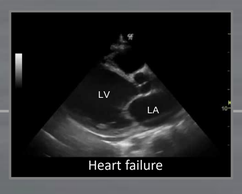

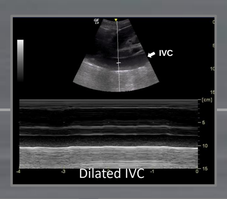

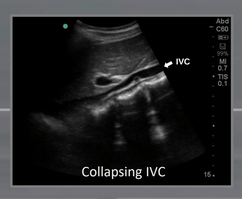

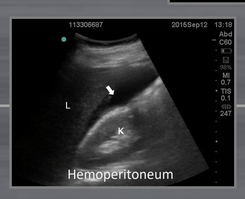

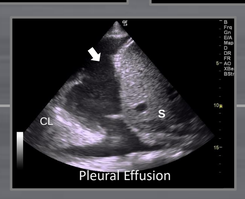

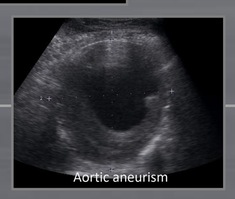

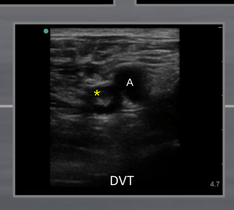

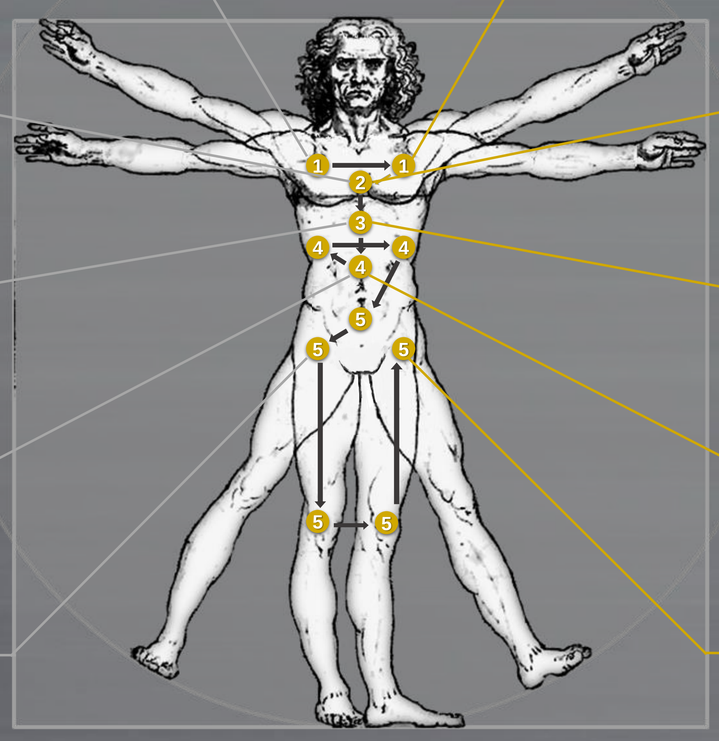

Exam	Anatomical landmarks	Pathological findings
L Lungs	▪ Mid-clavicular line; highest dependent part of chest (2,3 ICS in supine position) ▪ 4 lung zone scan for B lines	**Pneumothorax**: absent lung sliding **Pulmonary edema:** >2 B-lines in 3 or more lung zones
O Cardiac Output (ECHO)	▪ Parasternal long & short axis; Lt parasternal start at 2nd ICS ▪ Apical: start 5th ICS anterior axillary line ▪ Subcostal: below sternum	**Pulmonary embolism:** RV strain. Abnormal RV is equal or more in size to LV **Cardiogenic shock:** normal LV should contract by 1/3 of its diameter. EF can be estimated by eyeballing. **Pericardial tamponade:** hypoechoic fluid collection around the heart. **Hypovolemia:** collapsed chamber, hyperdynamic LV
W Water (IVC)	Subxyphoid; around 2cm Rt from the midline	**Hypovolemic and distributive shocks:** IVC < 1.5cm, collapsing >50% on inspiration **Obstructive and cardiogenic shocks:** IVC > 2.5cm, collapsing less than 50%
B Blood in cavities (AAA, FAFF & pleural space)	▪ AAA: Starting at subxyphoid area and followed all the way to umbilicus ▪ Hepato-renal (Morison's) view + Rt pleural space above diaphragm ▪ Spleno-renal view + Lt pleural space above diaphragm ▪ Suprapubic view in horizontal and vertical planes	**Leaking AAA** : intraperitoneal hypoechoic fluid. Aortic aneurysm > 3cm. Risk of rapture > 5cm **Pleural effusion:** loss of mirror image of liver/spleen at Rt/Lt diaphragmatic areas
P Pipes & pregnancy (uterus and DVT)	▪ Uterus can be visualized during FAFF exam while obtaining suprapubic view ▪ Femoral vein: Rt and Lt inguinal area ▪ Popliteal vein: Popliteal fossa	**Ectopic pregnancy:** intraperitoneal hypoechoic fluid, empty uterus or extra-uterine gestational sac **DVT:** non compressible veins, direct clot visualization

Background

n the practice of Emergency Medicine, the acute care of patients with undifferentiated shock requiring immediate medical attention is paramount. Diagnosing and treating patients in the acute phase of their illness, also deemed "the golden hour"(1), is a time-critical and vital role played by emergency department (ED) physicians. Vital signs and other parameters can aid with the early measurement of shock; but the main utility of ultrasound is to determine its underlying cause, leading to timely therapy. As it can represent a wide list of underlying pathologies, prompt and accurate diagnosis needs to be made by the treating physician for appropriate treatment initiation. Despite all the advances in medical care, shock continues to carry high morbidity and mortality exceeding that of myocardial infarction or penetrating chest trauma (2).

Role of Ultrasound In Shock

The use of point of care ultrasound (POCUS) is becoming widely established as a standard of care within Emergency and Intensive Care Departments. It is a safe, non-invasive tool, used as an extension of our clinical examinations; which can help answer focused questions and rule in/ out life-threatening diagnoses rapidly. Ultrasound can help determine both the severity and the causes of shock, within minutes and thus expedite definitive treatment. Recently there has been a trend to incorporate the use of ultrasound early in the care of a critically ill patient. Many protocols for the diagnosis and evaluation of shock have hence been developed which overall share the same fundamental elements and differ only by means of the sequence in which the exam is performed. Some of the popular protocols such as RUSH , HI-MAP and FAST and RELIABLE (3-5) use mnemonics making them more memorable in the critical "chaotic" resuscitation room. Although easy to remember, few of these protocols follow the sequence in which the scanning needs to be performed.

What is LOW-BP?

A novel systematic approach termed 'LOW BP' follows a sequence based on the anatomical location of organs scanned. This way the operator will start at the lungs and move all the way down to end his exam with lower limb scanning. The components of this mnemonic include; (L) for Lungs to look for pneumothorax, and pulmonary edema; (O) is for cardiac Output to cover cardiogenic shock, pulmonary embolism and pericardial tamponade; (W) stands for water and denotes the fluid status which is examined through the inferior vena cava scan; (B) is for Blood in body cavities covering peritoneal and pleural spaces; as well as scanning of abdominal aorta as a potentional source of blood loss. Finally (P) is for pipes and pregnancy to look for deep vein thrombosis and ectopic pregnancy. This approach is simple, easy to remember and covers all the important causes of hypotension frequently encountered in the emergency department. Its applicability can answer time-dependent focused clinical questions that can mandate change in management, imaging modality and even change in disposition.

Conclusion:

LOWBP offers a comprehensive scanning sequence which is easy to recall in a critical care environment which can often be stressful and chaotic. This is because of its systematic up to down approach, which is often not the case when using other protocols. A study in near future will be conducted to verify the use of the LOWBP protocol, to see if learners are able to conduct the examination with ease and in a timely manner, suited for critical care and emergency environments.

References:

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