Question 10 (21 marks) 9 minutes

i) State the two (2) features of Inferior vena cava measurement by ultrasound that supports a reduced central venous pressure measurement. (2 marks)

- **IVC diameter on end expiration of < 12 mm**
- **> 50% IVC collapse with inspiration** (associated with CVP < 8 in septic pt)

ii) State four (4) limitations to the use of inferior vena cava measurement by Ultrasound, in the Emergency Department setting, for the assessment of intravascular volume. (4marks)

- **Position- measurement only valid for supine position**
- **Inaccurate in Right heart disease**
- **Anatomic variability**
- **Effect of PPV- inspiratory collapse may be absent/ reversed**
- **Effect of PPV- significantly reduces sensitivity**
- **IVC may not collapse uniformly- index at any 1 point may not be representative**
- **Highly trained athletes- ↑ IVC diameter**
- **Concurrent CPR**
- **Inter-operator variability**
- **Operator experience/ advanced skill (not just "operator dependent")**

iii) Other than Inferior vena cava measurement, list four (4) uses for Bedside ECHO in the setting of a cardiac arrest. (4 marks)

- **Diagnosis of pericardial tamponade**
- **RH function**
- **LH function**
- **Valvular function**
- **To assist performance of pericardiocentesis**
- **Efficacy of external cardiac compressions**
- **Evidence of PE**
- **(TAD)**

iv) State three (3) arguments for the use of crystalloid in fluid resuscitation in shock. (3 marks)

- **In normal response to shock, fluid recruited from interstitial compartment into IV compartment-> interstitial hypovolaemia**
- **Replacing fluid distributed to entire ECF will return body to normal fluid state**
- **Efficacy- SAFE study- no mortality benefit of Albumin over NS**
- **No allergy risk**
- **No infection risk**

v) State three (3) arguments for the use of colloid in fluid resuscitation in shock. (3 marks)

- **Fluid is lost from IV space ∴ initial replacement should be to IV space**
- **More rapid IV volume expansion possible**
- **Less total volume theoretically required**
- **Interstitial dehydration may be beneficial in some circumstances (eg CHI, ARDS)**
- **Less iatrogenic hyperchloraemic acidosis than may occur with crystalloids**

vi) State five (5) current recommendations for fluid therapy in severe sepsis. (5 marks)

- **Begin as soon as sepsis recognised**
- **At least 20 ml/kg/ 2L in adults over 30 min**
- **Reduce rate if venous pressures improving without haemodynamic improvement**
- **Additional fluid required if recently ↓intake or ↑losses**

(From Surviving Sepsis campaign- 2012)

Fluid Therapy of Severe Sepsis

1. Crystalloids as the initial fluid of choice in the resuscitation of severe sepsis and septic shock (grade 1B).
2. Against the use of hydroxyethyl starches for fluid resuscitation of severe sepsis and septic shock (grade 1B).
3. Albumin in the fluid resuscitation of severe sepsis and septic shock when patients require substantial amounts of crystalloids (grade 2C).
4. Initial fluid challenge in patients with sepsis-induced tissue hypoperfusion with suspicion of hypovolemia to achieve a minimum of 30 mL/kg of crystalloids (a portion of this may be albumin equivalent). More rapid administration and greater amounts of fluid may be needed in some patients (grade 1C).
5. Fluid challenge technique be applied wherein fluid administration is continued as long as there is hemodynamic improvement either based on dynamic (eg, change in pulse pressure, stroke volume variation) or static (eg, arterial pressure, heart rate) variables (UG).

Reference- Dunn . Also Haemodynamic endpoints: MAP > 65, U/o > 0.5 ml/kg/hr, lactate < 4, CVP 8-12 (but NB- Question is not JUST an endpoint Q)