A 35 year old female, weighing 85 kg, 5 feet tall, with a history of poorly controlled insulin-dependent diabetes mellitus is admitted to hospital with fever, altered mental status and arm swelling, after cutting her hand while working outside, 24-hours prior to admission. On examination, the right arm was noted to have erythema, cutaneous gangrene and air in the soft tissue. Vital signs are respiratory rate 32/min, blood pressure 75/38 mmHg, mean arterial pressure (MAP) 44 mmHg and heart rate 130/min. Her oxygen saturation (SpO2) is 92% on room air. She appears to be disoriented and her laboratory work up reveals a blood glucose of 460 mg/dl (13.9 mmol/dl), white blood cell (WBC) count 23.4 x 10^3 /L, and hemoglobin 11.5 g/ dL.

Q 1: Which of the following statements regarding her initial management is TRUE:
A. Begin a vasopressor such as norepinephrine or dopamine with a target MAP of 60 mm Hg.
B. Focus on source control and perfusion enhancement (if possible using central venous pressure [CVP] monitoring and measurement of ScvO2).
C. Administer 100 mg hydrocortisone IV within 15 minutes of arrival.
D. Withhold antibiotic therapy until a MAP of 60 mm Hg is obtained ensuring adequate tissue perfusion.

Q 2: A surgical consultation is obtained and a presumptive diagnosis is made of necrotizing fasciitis involving the right arm. Which of the following statements regarding her management is TRUE:
A. Empiric antibiotic selection could include vancomycin and a β- lactum/β –lactamase inhibitor.
B. An alternative consultation should be sought since necrotizing fasciitis is unlikely to be present in this patient.
C. Antifungal therapy including amphotericin B should be promptly initiated prior to surgical debridement.
D. Appropriate antibiotic therapy should be initiated immediately and surgical debridement delay for 24-48 hours.

Q 3: Which of the following statement is not TRUE regarding the fluid resuscitation of a patient with severe sepsis:
A. Fluid resuscitation to target CVP of at least 8 mmHg.
B. Fluid challenge with 1000 ml crystalloid or 300-500 ml colloids over 30 minutes.
C. Vasopressor therapy to maintain MAP of 65 mm Hg.
D. Use of low dose dopamine for renal protection.

Q 4: The aim of initial resuscitative goals should include all except:
A. Central venous pressure (CVP) 8-12 mm Hg and mean arterial pressure (MAP) ≥ 65 mm Hg.
B. Urine output ≥ 0.5 ml/kg/hr
C. Central venous (superior vena cava) oxygen saturation ≥70% , or mixed venous ≥ 65%
D. Hematocrit of ≤ 20%.

Q 5: International guidelines regarding use of steroids in management of severe sepsis are all except:
A. Hydrocortisone dose should be ≤ 300 mg/day.
B. ACTH stimulation test is recommended to identify the subset of adults with septic shock who should receive hydrocortisone.
C. Steroid therapy may be weaned once vasopressors are no longer required.
D. Both A and C.

Q 6: Initial vasopressor of choice in septic shock is:
A. Phenylephrine
B. Norepinephrine
C. Dopamine
D. Vasopressin.

Q 7: Though not recommended phenylephrine can be used in treatment of septic shock in certain indications except:
A. Where norepinephrine is associated with serious arrhythmias.
B. Cardiac output is known to be high and blood pressure persistently low.
C. As salvage therapy when combined inotrope / vasopressor drugs and low dose vasopressin has failed to achieve MAP target.
D. Fluid refractory shock.

Q 8: Spontaneous breathing trial in weaning ARDS
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patient needs following criteria except:
A. PaO₂/FiO₂ > 200
B. PEEP ≤ 5cm H₂O
C. Minute ventilation > 15 L/min
D. Frequency/tidal volume (F/TV) ratio ≤ 105 during two-minute spontaneous breathing trial.

Q 8: All are TRUE regarding ventilator management guidelines in patient with ARDS are:
A. Inspiratory plateau pressure (Pplat) ≤ 30 cmH₂O
B. Maintain SaO₂/SpO₂ 88-95%
C. Reduce tidal volume to 6 ml/kg
D. Assist control mode- pressure control mode ventilation.

Q 10: All are contraindications for the use of low-molecular weight heparin (LMWH) except:
A. Thrombocytopenia
B. Severe coagulopathy
C. Recent intracerebral hemorrhage
D. Patients on mechanical ventilation.

ANSWERS

A 1: (B) A specific anatomic site of infection should be established as rapidly as possible and within first six hours of presentation. Resuscitation should begin immediately in patients with hypotension or elevated serum lactate > 4 mmol/L.

A 2: (A) Begin intravenous antibiotics as early as possible, and always within first hour of recognizing severe sepsis and septic shock. Start broad spectrum, one or more agents active against likely bacterial/fungal pathogens and with good penetration into presumed source. Implement source control measures as soon as possible following successful initial resuscitation.

A 3: (D) A large randomized trial and meta-analysis comparing low dose dopamine to placebo found no difference in either primary (peak serum creatinine, urine output) or secondary(survival to either ICU or hospital discharge) outcomes. Thus the available data do not support administration of low doses of dopamine solely to maintain renal functions.

A 4: (D) Goals during the first 6 hrs of resuscitation:
   a) Central venous pressure (CVP) 8–12 mmHg
   b) Mean arterial pressure (MAP) ≥ 65 mmHg
   c) Urine output ≥ 0.5 ml/kg/hr
   d) Central venous (superior vena cava) or mixed venous oxygen saturation 70% or 65%, respectively

If venous oxygen saturation target is not achieved:
-consider further fluids.
-transfuse packed red blood cells if required to achieve hematocrit of ≥ 30%.

A 5: (D) Overall trial population appear to benefit regardless of ACTH result, and the observation of potential interaction between steroid use and ACTH test was not statistically significant, therefore it is suggested that the ACTH stimulation test should not be used to identify the subset of adults with septic shock who should receive hydrocortisone.

A 6: (B) Norepinephrine is the vasopressor of choice in septic shock. Epinephrine should be first chosen alternative agent in septic shock that is poorly responsive to norepinephrine. Add low-dose vasopressin (0.03 unit/min) if patient remains hypotensive on catecholamine.

A 7: (D) Norepinephrine or epinephrine are used to treat fluid refractory shocks.

A 8: (C) Additional criteria for weaning are - Minute ventilation should be <15 L/min. Patient should be off vasopressors and continuous sedatives. Presence of cough during suction, resolving original illness and no new illness.

A 9: (D) Assist control mode – volume ventilation is suggested. Tidal volume can be reduced to as low as 4 mL/Kg predicted body weight to limit Pplat.

A 10: (D) Patients on mechanical ventilation are at a very high risk of developing DVT and need thromboprophylaxis with low-dose unfractionated heparin (UFH) or low-molecular weight heparins unless there are contraindications. In such patients graduated compression stockings (GCS) or intermittent compression devices (ICD) can be used unless contraindicated.

REFERENCES