

Medi Quest BRS Hospital

A monthly News letter from BRS Hospital

PREVENTION OF ACUTE KIDNEY INJURY IN SEPSIS

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Sepsis is a common cause for AKI in the ICU as well as other settings in the hospital and community. Identification of high-risk individuals for AKI in presence of sepsis would be the first step in prevention of AKI . The high risk factors for AKI include :

- Old age
- Hypovolaemia
- Hypotension
- Pre-existing renal
- Hepatic & cardiac dysfunction
- Diabetes Mellitus
- Exposure to nephrotoxins
- ACEI or ARB use

Prevention of AKI in sepsis should address the following :

- 1.How much fluids to be given ?
- 2.What type of fluid?
- 3.How to Control foci of sepsis?
- 4.What vasopressors to use?
- 5.When to transfuse blood?
- 6.Target blood sugar levels.

Volume resuscitation in sepsis is a "double-edged" fluid dilemma. Volume resuscitation restores cardiac output and oxygen delivery. But unrestricted infusion of fluids leads to tissue edema and organ dysfunction. Excessive fluid removal by diuretics or extracorporeal techniques can also cause severe hypovolemia and recurrent renal injury.

A stepwise approach has been suggested .An initial unrestricted fluid resuscitation aiming for a positive fluid balance, followed by period of steady fluid balance and finally appropriate rate of fluid removal aiming for a negative fluid balance would be ideal . Patients with sepsis and AKI are susceptible to fluid accumulation and its harmful consequences. Early RRT may improve outcome in these scenarios.

AMOUNT OF FLUIDS :

EGDT (Early Goal Directed Therapy) aimed to address the amount of fluids that is needed to be given in the initial phase of sepsis resuscitation. Amount of fluids given in first 6hrs was the target .The mean amount of fluids was 3-5 L in 6hrs based on this protocol .But later trials reported that a lower amount of fluids in the range of 2-3 L in first 6 hrs was associated with better outcome.

The exceptions to such aggressive fluid resuscitation are cardiac failure and ARDS.Fluids should be given in well defined boluses with reassessment periodically.Fluid resuscitation is continued until acceptable BP or tissue perfusion established. Fluid resuscitation is stopped if pulmonary edema ensues or failure to augment perfusion is noted. Fluid overload is linked to increased mortality and reduced kidney recovery.

EGDT TARGETS :

Fluid resuscitation is given to attain the following.

- 1.Mean arterial pressure (MAP) 65 mmHg
- 2.Urine output 0.5 mL/kg/hour
- 3.CVP : 8 to 12 mmHg
- 4.Superior vena cava oxyhemoglobin saturation (ScvO₂) 70 percent (when central access is available)

Subsequent trials showed aiming at lactate clearance of >10% was important in initial fluid resuscitation.

Lactate clearance is calculated by :

$$\frac{[(\text{initial lactate} - \text{lactate } >2 \text{ hours later})/\text{initial lactate}] \times 100}{}$$

Early administration of fluid appears to be more important in reducing mortality associated with sepsis. Once the targets of resuscitation are met and perfusion is restored, fluids can be reduced or stopped, and occasionally patients can be diuresed, when necessary.

TYPE OF FLUIDS GIVEN IN SEPSIS :

Isotonic crystalloid solutions should be used instead of colloids .Colloids carry risk of osmotic nephrosis - do not use hydroxyethyl starch and dextran solutions.

Balanced crystalloid perfusions (e.g., Ringer's lactate) may be preferred above isotonic salt solutions. Giving large amounts of NS can lead to hyperchloremic acidosis and hyperkalemia .

CONTROL OF SEPTIC FOCUS :

This is the primary therapeutic intervention. Most other interventions being purely supportive. Antibiotics should be administered within the first six hours of presentation or earlier.Suspicion of MRSA or Pseudomonas infections should be there in appropriate settings and appropriate antibiotics should be preferred.

Source control is essential. This involves removal of infected foreign bodies , vascular access devices , drainage of abcess , tissue debridement or amputation .

VASOPRESSIVE AND INOTROPIC SUPPORT :

Vasopressors are indicated if mean arterial pressure <60 mmHg . We should correct coexistent hypovolemia first. Most patients with septic shock require at least 2 liters of intravenous fluid in order for vasopressors to be maximally effective . However one needs to be careful if patient has Significant ARDS or heart failure.

First choice vasopressor in sepsis is Norepinephrine at dose of 0.01-3mcg/kg/min .

Vasopressin is the second-line agent in refractory vasodilatory shock. Doses of vasopressin above 0.04 units/min can cause coronary and mesenteric ischemia or skin necrosis.

Dobutamine is alternative if cardiac output is low. There is no good data to support the use of dopamine in septic shock.

TRANSFUSION POLICY :

A hematocrit level of 30% was considered optimal in sepsis . But more number of RBC transfusions cause higher nosocomial infection rates, more AKI and increased mortality.

A hematocrit level of 25% is now considered to be a more realistic target.

Restrictive strategy (transfusion if Hb<7g/dl) was found to have similar outcome when compared to liberal transfusion policy (transfusion if Hb <9 g/dl)

GLYCEMIC CONTROL :

Intensive insulin therapy (target Blood sugar of 80-110 mg/dl) increased incidence of severe hypoglycemia , and mortality also in few trials . Currently the target blood sugar in sepsis is about 140 – 180 mg/dl.

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Wishes You

A Very happy Tamil New Year 2018.