Source Control

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Objectives

• Define source control
• Review different types of sources of infection
• Summarize source control management in Septic Patient
• Analyze the impact of timing to source control

Source Control

• The term source control is defined as all the physical measures used to control a focus of an infection to restore optimal function. It helps by:
  – Eliminating source of infection
  – Controlling contamination
  – Restoring anatomy and function
• Effectiveness of Source control depends on the infection site, premorbid state and the resources available


Source Control

• Source control must be targeted at no more than 6-12 hours after identification


Source Control vs No Source Control

| Outcome Measurements | All Patients n=393 | Patients Receiving Source Control n=224 | Patients Receiving No Source Control n=169 | p
|----------------------|-------------------|----------------------------------------|-------------------------------------------|-------|
| Duration of mechanical ventilation, d mean (SD) | 11.6 (11.3) | 10.6 (11.9) | 11.7 (11.8) | 0.480
| Duration of hospitalization, d mean (SD) | 18.9 (11.3) | 18.8 (11.3) | 19.0 (11.4) | 0.016
| ICU day of death, d mean (SD) | 11.3 (11.5) | 11.3 (11.5) | 11.3 (11.5) | 0.920
| Hospital stay, d mean (SD) | 18.9 (11.3) | 18.8 (11.3) | 19.0 (11.4) | 0.007
| Mortality, % | 44% (30%) | 43% (30%) | 45% (30%) | 0.330

Rhodes et al. Crit Care Med. 2017; 45:323-324

Source Control

• Rapid identification of specific site of infection to determine whether it is amenable for source control measures

• 4 Ds of source control
  ➢ Drainage of an abscess
  ➢ Debridement of necrotic tissue
  ➢ Device removal
  ➢ Definitive control (resection)
Source of Infection

• Infection sites readily amenable for source control include:
  – Intra-abdominal abscesses
  – Gastrointestinal Perforation
  – Ischemic Bowel
  – Cholangitis
  – Cholecystitis
  – Necrotizing soft tissue infections
  – Pyleonephritis
  – Other deep space infection (empyema or septic arthritis)

Intra-Abdominal Infections (IAIs)

• IAIs are the second most common cause of admission to the ICU in septic patients
• Usually have an identified focus of infection
• Mortality could reach up to 100% without source control
• Timing to source control in IAI is critical to survival in patients with GI perforation
• Adequacy of source control is dictated by the clinical circumstances
• Get surgical consult as soon as possible

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Soft Tissue and Skin Infections

• 3rd most frequent cause of septic shock following Pneumonia and Intra-Abdominal Infections (IAIs)
• Severe soft tissue and skin infections can progress to Necrotizing Soft Tissue Infection (NSTI)
• If NSTI is diagnosed, rapid debridement should be determined
• Source control should be attempted as soon as focus of infection is detected
• Delayed surgical intervention (>12hrs) is associated with increased mortality
• Ongoing debridement should be performed as necessary for continuing local extension
• Broad spectrum antibiotics should be administered

Source Control — Vascular Access

• Remove intravascular access if they are identified as possible source of infection.
  – Obtain other vascular access prior to removing current access
  – Tunneled Catheter infections may be able to be treated with antimicrobial therapy if removal is not practical
• Least invasive measures should be used when interventions are necessary for source control. Source control interventions may cause further complications such as bleeding, fistulas, organ injury etc.

Other Infections

• Intra-pleural infection
  – Pleural infection is not an uncommon complication of PNA
  – Chest x-ray or CT scan could be used to determine the presence of pleural effusion. Its fast, safe & effective to determine accessibility to drain abscesses or pleural infected effusions
  – Thoracentesis and/or chest tube placement can be performed using an ultrasound
  – Ultrasounds are fast, safe & effective to determine accessibility to drain abscesses or pleural infected effusions
  – Get interventional radiology consult for drain placement if unable to perform at bedside

Other Infections

• Urinary tract infection
  – Most common cause is Catheter Associated Urinary Tract Infection (CAUTI)
    • Remove or replace catheter as soon as possible
    • Assess for catheter needs daily to prevent CAUTI
    – Blockage in urinary flow can be caused by obstructive uropathy
      • Drain the abscess for perineal abscess
      • Lithotomy to eliminate the obstruction
      • Nephrostomy in order to bypass the ureter
    – Broad spectrum antibiotics should be administered
    – Consult urology early
Source Control Recommended Actions

- Source control remains a cornerstone in the treatment of septic shock patients
- IAIIs and soft tissue infections are sites where a rapid source control is feasible
- Get early surgical consultation
- All efforts must be made to identify and control the source of infection as soon as possible


Interprofessional Education Module to Learn, Teach, and Optimize the Treatment of Sepsis

- Jeffrey P. Gonzales, PharmD
- Nirav G. Shah, MD
- Renee Dixon, MD
- Joan M. Davenport, RN, PhD
- Mojdeh Heavner, PharmD
- Samuel A. Tisherman, MD
- Tracey Wilson, DNP
- Siu Yan Amy Yeung, PharmD
- Nimeet Kapoor, RN
- Peter P. Olivieri, MD