UNIVERSITY of MARYLAND

Source Control

Nimeet Kapoor BSN, RN CCRN
Senior Clinical Nurse II
Medical Intensive Care Unit

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

Martinez et al. *Crit Care Med.* 2017; 45:11-19

Timing of Source Control

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

Surviving Sepsis Campaign

Source Control vs No Source Control

Outcome Measurements	All Patients, n = 3,663	Patients Not Requiring Source Control, n = 2,490	Patients Requiring Source Control, n = 1,173	P
Duration of mechanical ventilation, d, mean (SD)	6.88 (13.2)	6.78 (13.0)	7.11 (13.6)	0.480
Duration of vasopressors, d, mean (SD)	4.26 (7.2)	4.01 (6.6)	4.8 (8.4)	0.002
ICU stay, d, mean (SD)	11.8 (15.4)	11.6 (15.03)	12.3 (16.02)	0.202
Hospital stay, d, mean (SD)	29.04 (28.6)	27.4 (27.8)	32.5 (30.1)	< 0.001
Mortality, n (%)				
ICU	875 (23.9)	626 (25.1)	249 (21.2)	0.010
Hospital	1,088 (29.7)	756 (30.4)	332 (28.3)	0.203

Martinez et al. Crit Care Med. 2017; 45:11-19

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)

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

Source of Infection

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

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

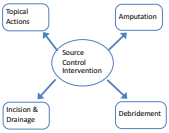
Intra-Abdominal Infections (IAIs)

- 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

Lagunes et al. *Ann Transl Med 2016; 4(17):330*

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 implemented
- Source control should be attempted as soon as focus of infection is detected
- Delayed surgical intervention (>12hrs) is associated with higher mortality
- Ongoing debridement should be performed as necessary for continuing local extension
- Broad spectrum antibiotics should be administered



Lagunes et al. Ann Transl Med 2016; 4(17):330

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.

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

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
  - – Thoracenthesis 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

Lagunes et al. Ann Transl Med 2016; 4(17):330

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

Lagunes et al. Ann Transl Med 2016; 4(17):330

Source Control Recommended Actions

- Source control remains a cornerstone in the treatment of septic shock patients
- IAIs 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

Lagunes et al. Ann Transl Med 2016; 4(17):330

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