ScieniQ Publishers

Advance Medical and Clinical Research

Review Article

Critically Ill Patient in Intensive Care Unit

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Received: 05 Oct 2020
Accepted: 09 Oct 2020
Published: 13 Oct 2020

Abstract

Intensive care includes a whole range of procedures from monitoring of vital signs, treatment and, of course, health care, all the way to resuscitation and maintenance of life of seriously ill, injured, life-threatening patients. The purpose of intensive treatment is to identify vulnerable patients, to continuously monitor their vital signs, to recognize in time the signs that announce a crisis situation and to quickly and effectively treat disorders of the function of organs or the organism as a whole. Intensive care units were created and developed due to the need to take care of an acutely ill or injured, life-threatening patient.

Keywords: Critically Ill Patient, Intensive Care Unit, Abdominal Pain, Complications

Introduction

The physical signs produced by injury are usually more evident and immediately significant than their history, especially if the patient is unconscious [1]. Obtaining the history of the type of injury and the possible forces involved, including information on the injured person's habits, such as drug or alcohol addictions, from the patient, family members, friends, onlookers or first-aiders who witnessed the event is always helpful but must not interfere with the initial rapid clinical assessment and resuscitation.Worldwide adoption of the principles enunciated in the Advanced Trauma Life Support course (ATLS) has established the value of a standardized approach to trauma assessment and management, especially in patients who have sustained injuries to more than one of their systems.

Some injured patients are brought directly to the accident and emergency department by ambulance, some severely injured patients may be brought in by private vehicles, or even walk into hospital, others may be given treatment at the site of the event. Even when an initial assessment has been made at the site of the event, it must be repeated in the hospital. When ambulance staff are involved, they may radio ahead and warn of their casualty's likely injuries, a measure that allows the trauma team to be alerted and immediately available. Patients presumed to have sustained major injuries should be taken straight to the resuscitation area for their primary hospital survey.

Even patients thought to have minor injuries should be carefully assessed by an experienced nurse or doctor as soon as possible, as apparently stable patients may have sustained serious injuries, which may have passed undetected during the initial assessment, especially when an influx of many injured patients overwhelms local resources.

Abdominal Pain

Patients presenting with symptoms of abdominal pain accompanied by distention, obstipation/constipation and/or nausea and vomiting should be suspected of having gastrointestinal obstruction [2]. Although symptoms of small bowel obstruction (SBO) and large bowel obstruction (LBO) are similar, aetiologies, diagnostic approach and therapeutic considerations are quite different. Sources of acute LBO can be separated into mechanical (colorectal carcinoma [CRC], diverticulitis, volvulus, faecal impaction, inflammatory bowel disease [IBD], anastomotic stricture and other pelvic malignancies), and non-mechanical causes (acute colonic pseudo-obstruction). Furthermore, obstruction can be complete or partial.

By carefully obtaining the history, one can often determine the particular cause of the obstruction prior to any imaging. Known history of abdominal malignancy or progressive complaints of constipation, decreasing stool calibre, haematochezia, vague abdominal pain, weight loss and general malaise raise suspicion of cancer. Recurrent, localised (usually left lower quadrant) pain radiating to the groin or perineum with defecation, and accompanied by fevers and constipation may represent diverticulitis. Colonic volvulus may not be associated with specific signs and symptoms aside from abdominal pain and distention most pronounced in the upper quadrants of the abdomen. Any of the aforementioned processes can also present with perforation leading to uncontrolled spillage of intestinal contents and progressive sepsis. Patients with faecal impaction are usually older with a long-standing history of constipation. Anastomotic strictures should be suspected in anyone with previous intestinal resections. Patients with IBD or history of radiation to the pelvis not infrequently present with obstruction; however, the possibility of strictures and/or malignancy should be entertained. Acute colonic pseudoobstruction (Ogilvie's syn

drome) should be considered in critically ill patients presenting with obstructive signs and symptoms. Finally, the possibility of a rectal foreign body should be entertained, especially in younger patients and those without pre-morbid complaints.

Initial attention should be focused on signs of systemic infection and haemodynamic compromise. These signs include altered mental status, hyper/hypothermia, tachycardia, hypotension and tachypnoea. Patients with the above findings cannot tolerate delay in operative intervention. Abdominal discomfort can be of various qualities depending on the process. In uncomplicated LBO abdominal pain is vague and periodic, occurring at 20- to 30-minute intervals corresponding to colonic smooth muscle activity. Localised abdominal findings occur from local irritation of peritoneum such as in perforated colon cancer or diverticulitis. Proximal bowel distention can be severe enough to lead to ischaemia and necrosis. In such cases, abdominal pain becomes progressively worse and is worse in the peri-umbilical region.

ABCs

In many surgical patients, particularly during ward rounds, the vital signs will be normal [3]. Often this can be determined simply by looking at the patient, by asking how they are and asking the nurse how the patient is doing. This essentially social introduction not only establishes rapport and relieves anxiety but also gives information regarding the ABCs, as it does with an acutely ill patient. However, always ask yourself whether the ABCs are normal; if doubt exists, a detailed immediate assessment should be performed. Using the system in this way can avoid simple errors, particularly when you are tired or stressed; it will also let you get to this point in a few seconds with stable patients.

Now that the patient has been immediately stabilised, as necessary, the aim is to gather information from a variety of sources, which will lead to a diagnosis of current or potential problems and, hence, to a plan of action. Immediate management manoeuvres are not an end in themselves – they simply buy time to solve the underlying problems. The full assessment incorporates a review of the charts and available results plus a full history and examination.

Complications

The main severe acute complications are pneumothorax, cardiac arrhythmias, air embolism, and hemothorax [4]. Later , infection of the catheter line can lead to systemic sepsis and even multisystem organ failure, which is the major cause of mortality, especially in immunocompromised patients and severely ill patients. Catheter tip bacterial colonization or thrombosis with consequent embolization of material can occur and may be associated with bacterial endocarditis or metastatic infection. Removal of the central line invariably follows infection. Air embolism, pneumothorax, and hemothorax are very rare with the jugular approach, but can be life-threatening. Catheter blockage or leakage due to a variety of problems may require removal and reinsertion or adjustment. Catheter tip migration can occur into the jugular (or subclavian depending on the vessel of insertion) vein, opposite subclavian vein, right heart, IVC, or even pulmonary artery but is relatively rare as the cuff holds it in place. Catheter fracture and embolism is reported and may require radiological or rarely open surgical removal. Axillary, subclavian, internal jugular, or superior vena cava venous thrombosis can cause severe swelling of the arm, neck, head, and chest. Failure to thread the wire can be a problem, particularly in renal patients who have had previous central venous lines. Carotid artery puncture may be minimized by the use of ultrasound guidance. Cardiac arrhythmias are common when the guidewire enters the heart chamber, usually irritating the sinoatrial node, usually terminated by withdrawal of the catheter from the right atrium into the SVC. Catheter or guidewire vascular perforation is very rare, especially with J-hooked, soft-tipped guidewires or soft catheters, but both are well reported. Cardiac perforation and tamponade is exceedingly rare.

Critically Ill Patient

The term 'critical illness' describes the condition of a patient who has a likely, imminent or established requirement for organ support; in simple terms where death is possible without timely and appropriate intervention [5]. Some patients are at greater risk of developing critical illness than others. Also certain conditions bring a likelihood of severe physiological stress. It is unfortunately commonplace for the junior surgeon to be faced with a critically ill surgical patient, in various situations-from the peritonitic teenager admitted to A&E to the elderly postoperative hip replacement on HDU. It is crucial that a systematic approach is taken to assessment and treatment.

While it is more challenging to manage the patient with multiple organ failure it is rarely rewarding; rescuing the elderly post-laparotomy patient from cardiac failure brought about by fast atrial fibrillation is far harder than anticipating the hypokalaemia (causing the cardiac irritability) associated with ileus: prediction and prevention is essential. Prediction can begin with pre-operative assessment (such as identifying chronic airways disease or poor nutritional state) but continues through knowledge of the common problems associated with the condition/operation (such as the risk of chest infection after laparotomy). Prevention encompasses specific steps such as adequate replacement of fluid and electrolytes, adequate analgesia, chest physiotherapy and thromboprophylaxis, but the role of regular review (e.g. ward rounds) cannot be overstated.

Conversely a failure to assess patients regularly, to identify and act upon abnormal findings, to check whether one's interventions have been carried out and whether they have been effective/sufficient, will make successful management less likely.

Even in the setting of an elective surgical practice or a nearby acute care surgery institution, every practicing surgeon can be faced with managing disease in keeping with the primary goals of surgical critical care [6]. Trauma, intestinal hemorrhage, intestinal perforation, leaking anastomoses, and pancreatitis are common examples of disease states that could provide such a challenge and opportunity. The fundamentals of good surgical care—resuscitation of the circulation, debridement of dead tissue, drainage of infection, and minimizing surgical trauma— all diminish the risk of cellular injury, organ malfunction, and the associated morbidity and mortality threats.

Critically ill patients often have factors that complicate obtaining peripheral access, such as hypovolemia, edema, obesity, a history of IV drug abuse, chronic kidney disease, vasculopathy, diabetes, and/or other chronic disease [7]. The placement of the peripheral IV in normal adults is relatively simple and may be performed by nurses, technicians, and physicians. However, in emergency and critical settings, the clinical setting and the need for larger bore catheters frequently requires more experienced care providers and may be aided by adjunctive technologies, such as ultrasound and hand-held venous illumination/visualization devices. The use of ultrasound has been shown to improve success in obtaining access expeditiously compared to standard approaches. Initially shown to be beneficial for central venous catheter placement, ultrasound has now been widely studied for peripheral venous access as well. One downside is that it does require additional training. Both single- and double-operator techniques have been described. The double-operator technique where one provider holds the probe, and the other provider cannulates the vein is associated with higher success rates. Fewer skin punctures and increased patient satisfaction has also been described with this method of IV placement.

Surgeon

A surgeon's decision-making is generally motivated by pursuit of the patient's best interests, yet other motivators lurk in the shadows; for example, pursuit of the surgeon's interests, such as increasing personal income [8]. Most surgeons recognize the importance of placing the patient's interests above their own and reject even the intimation of any temptation to recommend unjustified operations for personal gain.

Surgeons who wish to be innovative, however, may have additional interests of their own to pursue ahead of those of their patients: the intangible reward of emotional excitement from breaking new ground and making new discoveries, the possibility of enhanced reputation and of academic advancement through discovery of new information and its publication; the possibility of obtaining grants, awards, or contracts to create a formal clinical trial if an innovation is successful, and perhaps the satisfaction of very strong personal dedication to advancing the science of medicine.

ICU

Intra-abdominal pathology necessitating surgical intervention occurs in approximately 4% of patients admitted to the intensive care unit (ICU) [9]. The number of patients requiring surgical evaluation is several fold higher. The most common etiologies necessitating surgical intervention in ICU patients are bowel perforation, bowel ischemia, cholecystitis, bowel obstruction, and cecal/sigmoid volvulus. An emerging indication for operation in ICU patients is fulminant antibiotic associated colitis from Clostridium difficile infection. Distinguishing those in need of surgical intervention from the total population evaluated is difficult; many of the characteristics accompanying critical illness, such as mechanical ventilation, narcotics and sedatives, and distracting pathology (e.g., stroke), confound the ability to obtain an accurate historical and physical examination. Thus, diagnosis relies heavily upon ancillary laboratory and radiologic studies. At times, even these can be difficult to obtain in the critically ill patient with tenuous physiology that limits the diagnostic armamentarium that can be brought to the bedside. Nevertheless, timely diagnosis is essential, as any delay, in either diagnosis or treatment, is associated with a poor outcome.

The care of critically ill patients requires a thorough understanding of pathophysiology and is centered initially around resuscitation of patients at extremes of physiologic deterioration [10]. This resuscitation is often fast-paced and may have to be begun without a detailed awareness of the patient's chronic medical problems. While physiologic stabilization is taking place, intensivists attempt to gather important background medical information to supplement the real-time assessment of the patient's current physiologic conditions. Numerous tools are available to assist intensivists in the accurate assessment of pathophysiology and to support incipient organ failures, thus offering a window of opportunity for diagnosing and treating underlying disease(s) in a stabilized patient. Indeed, the use of invasive interventions such as mechanical ventilation and renal replacement therapy as well as diagnostic tools such as central venous and pulmonary artery catheters are commonplace in the intensive care unit.

Categorization of a patient's illness into grades of severity occurs frequently in the ICU. There are numerous severity-of-illness scoring systems that have been developed and validated over the past two decades. While these scoring systems have been validated as tools to assess populations of critically ill patients accurately, their utility in predicting individual patient outcomes is not clear.

Severity-of-illness scoring systems are important for defining populations of critically ill patients. This allows effective comparison of groups of patients enrolled in clinical trials. To be assured that a purported benefit of a therapy is real, investigators must be assured that different groups involved in a clinical trial have similar illness severities. These scores are also useful in guiding hospital administrative policies. Allocation of resources, such as nursing and ancillary care, can be directed by such scoring systems. Severity-of-illness scoring systems can also assist in the assessment of quality of ICU care over time.

Healthcare

The ability of healthcare to save and extend life and improve the quality of life for the ill is a testament to the success of human competencies, technology and scientific inquiry [11]. Perhaps as a result, most healthcare systems are challenged by issues of access, quality, and cost. Although most institutions and systems provide safe and effective care for the vast majority of patients most of the time, unwanted variation in quality and safety is common. The causes for this are many and not always well understood but, in general, they result from an increasingly complex healthcare environment, rapidly exploding medical knowledge; poor evidence for the treatments available; and an overreliance on subjective judgment.

It is important to distinguish poor outcomes due to the nature and progression of disease and expected rates of complications from substandard medical care. Unfortunately, this distinction is not always obvious and poor outcomes are often misattributed to patient comorbidity. Additionally, evidence-based medicine and tools to standardize processes of care (care pathways and treatment algorithms) may not be properly implemented or may not produce the desired results.

Each member of the healthcare team must be skilled, competent, and unbiased in their ability to choose the right therapy for their patients. The healthcare system fails when thoughts, decisions, and actions deviate from this fiduciary and ethical duty. Patient safety can be seen as the "low-hanging fruit" of the quality "tree." Efforts to improve quality must begin with avoiding patient harm. Evaluation and reporting of "near misses" is an essential activity in order to promote organizational learning and continuous improvement. Reporting, however, alone does not appear to capture many of these events. Quality cannot be reliably improved when unsafe systems, unmitigated hazards, and other safety-related issues persist throughout the system.

Conclusion

Intensive care includes the supervision, care, treatment and maintenance of the lives of seriously ill or severely injured patients. Severely ill and injured patients have unstable physiological functions and therefore small changes in the work of the heart, kidneys, liver, lungs and the like can lead to serious and irreparable organ damage and even death of the patient. The characteristics of intensive treatment are monitoring of the function of organs and the organism as a whole, and fast and specific treatment when necessary. Continuous monitoring of the patient's vital signs and organ function allows the observation of small changes and rapid treatment and restoration of organ function without permanent damage.

References

1. Browse NL, Black J, Burnand KG, Thomas WEG (2005)Browse's Introduction to the Symptoms & Signs of Surgical Disease, Fourth Edition", CRC Press,Taylor & Francis Group, Boca Raton, USA, pp. 36.
2. Voskresensky IV, Cotton BA (2010)Large Bowel Obstruction" in Brooks, A.; Cotton, B. A.; Tai, N.; Mahoney,P. F. (eds): „Emergency Surgery", Blackwell Publishing Ltd, : John Wiley & Sons Ltd, Chichester, UK, pp. 86.
3. Loftus I (ed) (2010)Care of The Critically Ill Surgical Patient, Third Edition", Hodder Arnold, The Royal College of Surgeons of England, London, UK, pp. 18.
4. Russell C, King D, Coventry BJ (2014)Vascular Access Surgery" in Coventry, B. J. (ed): „Cardio-Thoracic, Vascular, Renal and Trans-

plant Surgery", Springer-Verlag, London, UK, pp. 90.
5. Franklin IJ, Dawson PM, Rodway AD. Essentials of Clinical Surgery, Second Edition", Saunders, Elsevier, Edinburgh, UK, pp. 43.
6. Burchard KW (2012)The Clinical Handbook for Surgical Critical Care, Second Edition", CRC Press, Taylor & Francis Group, Boca Raton, USA, pp. 2.
7. Young JB, Gondek SP, Kahn SA, May AK (2017) „Challenging IV Access in the Patientwith Septic Shock" in Diaz, J. J.; Efron, D. T. (eds): „Complications in Acute Care Surgery - The Management of Difficult Clinical Scenarios", Springer International Publishing AG, Cham, Switzerland, pp. 2.
8. Morreim H, Mack MJ, Sade RM (2015)„Surgical Inovation – Too Risky to Remain Unregulated?" in Sade, R. M. (ed): „The Ethics of Surgery - Conflicts and Controversies", Oxford University Press, Oxford, UK, pp. 182.
9. Rosengart MR (2013) „Acute Abdomen in ICU Patients" in Peitzman, A. B.; Yealy, D. M.; Fabian, T. C.; Rhodes, M.; Schwab, C. W. (eds): „The Trauma Manual - Trauma and Acute Care Surgery, Fourth Edition", Wolters Kluwer, Lippincott Williams & Wilkins, Philadelphia, USA, pp. 574.
10. KressJP, Hall JB (2005) „Principles of Critical Care Medicine" in Kasper, D. L.; Brauwald, E.; Fauci, A. S.; Hauser, S. L.; Longo, D. L.; Jameson, J. L. (eds): „Harrison's Principles of Internal Medicine, 16th Edition", McGraw-Hill Companies, Inc., New York, USA, pp. 1581.
11. Sanchez JA, Lobdell KW (2017) „The Burning Platform: Improving Surgical Quality and Keeping Patients Safe" in Sanchez, J. A.; Barach, P.; Johnson, J. K.; Jacobs, J. P. (eds): „Surgical Patient Care - Improving Safety, Quality and Value", Springer International Publishing AG, Cham, Switzerland, pp. 3-4.