

# Perspectives

Recovery Strategies from the OR to Home

## In This Issue

In this issue of *Perspectives*, Ms. Base-Smith has written a tribute to those health professionals who tried so valiantly to save lives in the aftermath of the attacks of September 11th. Ms. Base-Smith worked at Ground Zero days after the tragedy. What she saw there inspired her to write an article on trauma. Aside from these catastrophic events, trauma kills more people from 1 to 44 years of age than disease. More than one-third of a million people are permanently disabled by trauma, which mounts billions of dollars in medical, employment, rehabilitative, and social costs. The author describes nursing intervention strategies in trauma care along the continuum from triage to emergency care, ICU care to rehabilitation.

In Part II of *Management of Inflammatory Bowel Disease*, Ms. Colwell discusses the management of Crohn's Disease (CD). For many patients, CD is a chronic disease. Quality of life is an important factor, when planning care of this patient population. The unpredictability of CD and the social burden of a bowel disease can influence socialization and the patient's general well being. The patient's plan of care should include a team approach to help the patient to achieve the highest level of functioning while living with CD.

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## Trauma in the 21<sup>st</sup> century

by Victoria Base-Smith, MSN, CRNA, CCRN, PhD (c)

This article is dedicated to those who lost their sense of security, freedom from fear, and lives in the attacks of September 11, 2001. The attacks and their sequelae depict the scope and urgency of experiences that nurses encounter when treating victims of physical and psychological trauma, often as first responders to a disaster scene. Trauma imposes a destabilizing impact on personal, social, and economic equilibria. During and between moments of great human suffering, nurses make a difference at every transition from triage to recovery.

Whether intentionally provoked by war, terrorism, homicide, sexual assault, or suicide – or unintentionally sustained by accidental poisoning, drowning, motor vehicles, falls, or fire – traumatic injuries have increased with mechanization of the workplace, technological advancement, and sociopolitical turmoil. Proportional to the rising incidence and severity of trauma are the acquisition of an extensive knowledge base and progress towards the multidisciplinary treatment of traumatic injury. The emergence of the medical subspecialty of traumatology signifies the importance of these advances. In addition, ongoing clinical, academic, and public education efforts are dramatically reducing trauma-related deaths and injuries, giving many people a second chance to live.

Traumatic injury induced by the ravages of military warfare has catalyzed the development and systematization of rescue, surgical, therapeutic, and recovery strategies. Pioneers who confronted the traumatic injuries of soldiers and civilians in conflicts of recent centuries have contributed to facets of traumatic therapeutics that remain useful to this day. Ironically, superiority in weaponry and strategy has not prepared the United States for 21<sup>st</sup>-century warfare. Americans have

awakened to the reality of a new type of military conflict – one characterized not only by nuclear and incendiary potential, but by insidious biological and chemical weaponry as well as philosophical attacks borne on the backs of suicide bombers. As nurses, we must educate and ready ourselves for trauma management in the post-September 11<sup>th</sup> era.

Outside the military realm, the mechanization of work and leisure has led to thousands of employment-, transportation-, and recreation-related injuries every year. Personal injury during social interactions, whether intentional or accidental, has escalated the incidence of trauma. Changing weather patterns, earthquakes, and oceanographic events, such as El Niño, have provoked natural disasters leading to trauma of country-wide proportions. Man-made disasters stemming from accidents further illuminate the depth and breadth of causation.

To address trauma and its multiple aspects, the Emergency Medical Services Systems Act was created in 1973. Its purpose is to implement and integrate a national trauma management system that embraces not only the treatment of trauma but the development of guidelines and financing for federal, state, and local prevention programs; preparation of hospitals and municipal- or civilian-response organizations; funding of trauma research and education; and specific guidelines for on-site disaster relief and management.<sup>1,2</sup> Examples of some organizations that support the nation during disasters are the Federal Emergency Management Administration (FEMA), Office of Emergency Management (OEM), Centers for Disease Control (CDC), National Safety and Transportation Board (NSTB), Urban Search and Rescue (USAR), and the American Red Cross.

Continued on page 4



# Management of Patients with Inflammatory Bowel Disease

## Part 2: Crohn's Disease (CD)

By Jan Colwell, RN, MS, CWOCC

CD can involve any segment or combination of segments of the GI tract from the mouth to anus. The ileocecal region is the most common site for initial presentation; it is observed in about 40% of patients.<sup>1</sup> Disease is limited to the small bowel in 30% of patients; colonic CD occurs in about 25%. Ulcerations in CD extend linearly, leaving normal islands of mucosa, to produce a “cobblestone appearance” or may extend deeply through layers of the bowel wall, producing a fistula. As CD heals, fibrotic changes replace acute inflammation, creating permanent strictures. Focal, transmural involvement of CD associated with aphthoid or linear ulcers, fissures, fistulas, perianal disease, or small bowel disease differentiates CD from Ulcerative Colitis. (UC)

### Presentation

The symptoms of CD are determined by site and extent of inflammation. The principal symptoms in the ileocecal region are diarrhea, cramping abdominal pain, and low-grade fever. A high fever in CD suggests abscess formation. Pain and tenderness are due to transmural inflammation. Small bowel disease is associated with the loss of effective digestion and absorptive surface, resulting in malabsorption (with weight loss) and diarrhea. Patients with colonic disease present with cramping abdominal pain (caused by passage of stool through a narrowed and inflamed segment of large bowel), fever (an inflammatory mass), malaise, weakness, and weight loss.<sup>1</sup> Perianal disease is associated with incontinence, stricture, perirectal abscess, or anorectal fistula.

### Diagnosis

Colonoscopy and/or upper endoscopy examinations exhibit focal inflammation with aphthoid ulcers, linear ulcers with normal areas of mucosa (skip areas), and possible perianal fistulas or abscesses. To determine the extent of small bowel disease, a small bowel enteroclysis (small bowel enema) is useful, because this region cannot be adequately viewed endoscopically. Computerized tomography (CT) is used to clarify the presence of a thickened bowel wall or to identify abscesses.<sup>2</sup>

### Medical treatment

The treatment of CD depends on the disease location, severity, and complications. Treatment is individualized according to patient response. Therapy is sequential. The first goal is to treat acute disease; the second, to maintain clinical remission.<sup>2</sup>

*Sulfasalazine* has been effective for mild to moderate CD when the colon is involved. It is not effective for the treatment of small bowel CD. 5-ASA (mesalamine) appears to be effective in mild to moderate CD in doses equal to or greater than 3.2g/day.<sup>2</sup>

*Corticosteroids* remain the mainstay of therapy for active CD. Used in doses of 40-60 mg initially, they are useful for treatment of acute disease but not recommended for maintenance therapy. Corticosteroid administration is limited by its adverse effects.

*Immunomodulators*, azathioprine or 6-MP, are used in the treatment of CD. Accepted indications include steroid dependence, refractory disease, and fistulous disease.<sup>4,5</sup> Oral, high-dose cyclosporine for inflammatory or fistulous disease appears to produce short-term benefits but lacks sustained effectiveness, i.e., relapse when cyclosporine was discontinued has been reported in studies.<sup>6</sup> Parenteral methotrexate has been used with promising results, but it still under examination.

*Antibiotics* are used in CD most often for the treatment of perianal disease. Metronidazole (Flagyl) can relieve symptoms of CD, reduce acute phase reactants, and heal perianal disease.<sup>1</sup> The side effects of metronidazole include coating of the tongue, nausea, and peripheral neuropathy. These effects can limit use. The use of ciprofloxacin has not been adequately studied; however, many clinicians currently use it as adjunctive therapy in the treatment of active luminal disease as well as perineal fistulous disease.<sup>3</sup>

*Biological therapy*, specifically infliximab (Remicade), has been studied in the treatment of CD. Infliximab is a monoclonal antibody directed against tumor necrosis factor, a key cytokine that initiates a cascade of events leading to an inflamed bowel.<sup>7</sup> Studies thus far have demonstrated clinical efficacy in patients with intractable CD. It may be beneficial for

maintenance of patients with severe disease. Remicade is currently approved for steroid-dependent or steroid-resistant patients who have not responded to the optimized use of 6-MP or AZA.<sup>8</sup> It is delivered in a 2-hour infusion. Future studies are underway to determine the usefulness of infliximab in the treatment of CD.

*Nutritional intervention* may be helpful to reduce CD-related symptoms and treat nutrient deficiencies, while they have no effect on the natural course of the disease in patients with UC.<sup>7</sup> Elemental diets may provide bowel rest, because these nutrients are absorbed rapidly in the proximal small intestine. TPN is used in some patients, where intestinal absorption is compromised. However, while these dietary changes are helpful in some patients, a high rate of relapse occurs when they are discontinued. Bowel rest does not affect the course of CD, once therapy is discontinued.<sup>1</sup>

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### Surgical treatment

Surgery is not curative and only indicated in patients with CD to treat complications.<sup>9</sup> Indications include recurrent intestinal obstruction, complicated fistulas, abscesses, perforation, hemorrhage, or failure of medical therapy.<sup>10</sup> Most patients with CD require one or more operations in their lifetime. The Cleveland Clinic reports that 90% of patients with ileocecal disease eventually require surgery and 70% of all patients with ileal or colonic disease required similar intervention.<sup>11</sup>

The types of surgery for CD include intestinal resection with or without anastomosis, bypass procedure (internal or external), or stricturoplasty.

Patients with Crohn's disease who require surgical intervention have most likely been treated with corticosteroids. They may have fluid retention, skin and tissue edema, and wound-healing disturbances. Anemia as well as fluid and electrolyte imbalances due to poor nutrition, malabsorption, diarrhea, etc., may be present. All of these factors must be considered when preparing a patient with CD for surgery.

Prior to surgery, endoscopic and imaging studies are done to help in the planning of the intervention. Bowel cleansing prior to surgery depends on the patient's condition and may not be indicated in the presence of bowel obstruction. The use of prophylactic antibiotics is controversial. If used, the antibiotic is given to the patient on the call to the

operating room and, in some cases, for several days postoperatively. If the patient has taken corticosteroids before surgery, a stress dose is given in the perioperative period.

The most commonly performed surgical intervention for CD is a small bowel resection. At one time, wide margins of resection were thought to be necessary, but evidence now supports conservative resection margins, which save as much small intestine as possible.<sup>15</sup> The diseased segment of intestine is removed and a primary intestinal anastomosis is performed. In some cases, a temporary or permanent diversion may be required.

In the past, strictured segments of bowel were resected during surgery, but concerns about short bowel syndrome have arisen due to the recurrent nature of CD. In 1997, Katariya described the technique of stricturoplasty. This procedure effectively improves obstructive symptoms, while safely preserving the affected small bowel.<sup>12</sup> Stricturoplasty involves identifying the strictured area (a scarred and/or diseased segment). A linear antimesenteric incision is made several centimeters beyond both sides of the stricture. Sutures are placed at both edges of the site and traction is applied to convert the longitudinal defect into a transverse one, and the wound is closed.<sup>11</sup> Most reports of the use of stricturoplasty are limited to the small bowel. Complication rates for stricturoplasty are low,<sup>13</sup> and it now appears that his procedure is an important surgical intervention in the management of small bowel CD.

Treatment of CD of the colon (Crohn's colitis) depends on the location of disease. It is individualized for each patient's specific situation. Disease of the right colon and transverse colon is generally treated with a hemicolectomy and primary anastomosis. Pancolitis with rectal sparing can be treated with a total abdominal colectomy and ileorectal anastomosis. To avoid problems with significant debilitating diarrhea, it is recommended that 10-14 cm of rectum should be disease-free.<sup>15</sup>

CD of the entire colon and rectum requires a total proctocolectomy with a permanent ileostomy. Rectal CD is an unusual presentation and can be surgically managed with a proctectomy (removal of the rectum with permanent end colostomy). Because of the reported risks of recurrent colonic disease, a total proctocolectomy with end ileostomy is advocated.<sup>15</sup>

### Postoperative care

After surgery for CD, postoperative care involves IV hydration and support for the patient until the return of bowel function. Once the passage of flatus or stool is noted, a liquid diet is begun. When tolerated, the patient advances to a low-residue diet. Patients are advised to eliminate roughage until bowel edema subsides, which is generally 4-6 weeks after surgery.

Fecal output is routinely measured. If a

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high fecal output is present, dietary manipulation is required and antiarrhythmic medication is started. A Foley catheter can be used to prevent bladder distention in the area. A Foley catheter legband holder may be applied to prevent catheter movement and further complications. The patient with a stoma will receive ostomy education and support from a nurse specialist who is certified in wound, ostomy, and continence care. Steroids are tapered on a specific schedule to avoid complications.

### Conclusion

For many patients, CD is a chronic disease. The patient's therapeutic plan must keep the long-term outlook in sight. Quality of life is an important factor, when planning care of this patient population. The unpredictability of CD and the social burden of a bowel disease can influence socialization and the patient's general well being.

Patients and their families require education and ongoing support while dealing with the treatment of this disease. Resources, such as the Crohn's and Colitis Foundation, and the United Ostomy Association, the Wound, Ostomy and Continence Nurses Society, should be extended to patients and their families.

The patient's plan of care should include a team approach (IBD gastroenterologists, nutritional support staff, IBD surgeon, nurse specialists, and social service staff) to help the patient to achieve the highest level of functioning while living with CD.

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## Scope of Trauma

Trauma kills more people from 1 to 44 years of age than disease.<sup>3</sup> It causes 43% of deaths in 1- to 4-year-olds, 48% of deaths in 5- to 14-year-olds, and 62% of deaths in 15- to 24-year-olds.<sup>3</sup> Barton<sup>1</sup> attributes 160,000 deaths per year to trauma. Based on tabulation and reporting differences, deaths from intentional or unintentional trauma may be closer to 200,000 annually.<sup>4</sup> And, more than one-third of a million people are permanently disabled by trauma, costing billions of dollars in medical, employment, rehabilitative, and social costs.<sup>1,2</sup>

## Triage and In-the-field Care

The tasks of first responders are: rapid assessment, resuscitation, stabilization, and transportation of the injured.<sup>2</sup> Teamwork and communication are required to limit injury to oneself and support the safety of other rescuers.

Upon arrival to the emergency scene, health-care workers become acutely aware of the major causes of traumatic injury: blunt, penetrating, thermal, and explosive force. Less visible and infrequent sources, such as ionizing radiation (Chernobyl) and biological contaminants (anthrax), may be added to the list. Very promptly, rescuers “size up the scene” and assess their capability to respond, in terms of personnel and equipment. The proximity of fire, smoke, falling debris, rising water, and live electricity and the potential for exposure to toxic chemicals or infectious agents are assessed. When calling for help, the location and brief details of situation, including “how many” and “how bad”, are reported.<sup>5,6</sup>

When triaging multiple casualties, resources are directed toward those who will most benefit: the silent, often critically wounded, unconscious victims instead of the “nearest and noisiest”.<sup>5</sup> Triage nurses and other rescue personnel must be “blind to horrific sites, deaf to the cries of the injured, have the wisdom of Solomon, and the patience of Job”.<sup>7</sup>

The first responsibility is to extricate the victim. It is assumed that the victim has a c-spine injury, and the first task is to stabilize the neck and spine. If extrication is prolonged, basic or advanced cardiac life support is begun. Once the victim is safe, primary attention focuses on the airway, breathing, and circulation (ABCs). Respiration is supported via jaw thrust, intubation, or ambubag-mask ventilation. Mouth-to-mouth resuscitation may be initiated on children and infants in extremis, although using this technique is a personal decision that may no longer be sanctioned by many rescuers. Evaluation of heart rate and circulatory function (bradycardic, tachycardic, thready pulse, and cool, clammy, or cyanotic extremities) ensues to determine hardness. Bleeding is tamponaded with direct pressure,

elevation of the extremity, or tourniquet, if required, to prevent exsanguination and save life. Intravenous cannulation and fluid administration, if available, are begun for medication administration and volume resuscitation. Victims are warmed with blankets to reduce hypothermia, slow coagulopathy, provide comfort, and protect from the environment (rain, falling debris).

About 50% of victims die within moments of traumatic injury.<sup>8</sup> Of them, 55% die from head injury, e.g., a severe disruption of brain tissue, brain stem, or upper spinal cord that leads to cessation of respiration.<sup>6,8</sup> The second cause of death is laceration of the heart, liver, or major blood vessels, such as the aorta, carotids, or vena cava.

For the fatally wounded, nursing care focuses on the spiritual and physical comfort of the dying. As their lives draw to a fearful close, nurses in the field hold them, pray with them, and receive their last words. It is a privilege to serve in such a circumstance.

Whenever possible, the injured are identified. They are ‘tagged’ with critical information, such as name, allergies, medications, pregnancy, and comorbidities (e.g., diabetes, coronary artery disease, seizure disorders). These data are provided by writing information on adhesive tape, applied to the person’s clothing, or directly on the victim’s clothes. The tags relay pertinent information to hospital personnel.

Transport to hospitals and first-aid sites occurs via ambulances, helicopters, cars, stretchers, wheelbarrows, wagons, and even piggyback rides. It cannot be overstressed that rescuers must maintain c-spine immobilization and the ABCs to minimize the likelihood of permanent neurologic injury and morbidity.

## Hospital Care

### Emergency room

Eighty percent of admissions to the emergency room for trauma are non-urgent. Ten to fifteen percent are urgent but not immediately life threatening. Severe, life-threatening injuries comprise 5% of admissions. Half of severely injured victims die within the first one to two hours due to neurologic or pulmonary impairment, splenic rupture, orthopaedic, or multi-organ injury with hemorrhage.<sup>1,2,7,8</sup> Exsanguinating, eviscerated, or open head-injured patients are admitted directly to surgery.

Victims resuscitated within 60 to 90 minutes at a level 1 trauma center have a significantly greater chance of surviving and returning to their activities of daily living.<sup>1,7,8</sup> A level 1 trauma center has medical air evacuation and around-the-clock, expert support services in every specialty, 365 days per year.

Nurses stabilize patients who arrive with less life-threatening injuries for further evaluation. Patients are given oxygen via cannula or mask, then connected to diagnostic monitors. ECG rhythm, oxygen saturation via pulse

oximetry, and blood pressure are observed continually. The airway, breathing, circulation (ABCs), and neurologic function are evaluated with the Glasgow Coma Scale (GCS). C-spine immobility is retained until the patient is “cleared” by the radiologist and neurologist, indicating that the neck is stable and that the brace or collar can be removed. Patients are auscultated for breath sounds and examined for other injuries, such as bullet entry site, stab wounds, flail chest, pneumothorax, cardiac tamponade, or tracheal deviation.

Many victims arrive with an endotracheal tube, oxygen mask, or other airway device in position, especially when injured by burns, gunshot wounds, or injuries to the head and torso. Prepackaged devices can secure endotracheal and tracheostomy tubes, with Velcro closures, especially when little time for application or surface area for adhesive tape exists.

Emergency room (ER) nurses will cannulate peripheral veins with a large-bore (14- to 18-gauge) intravenous (IV) catheter, if possible and necessary. The Dale bendable ArmBoard™ (Figure 1) with adjustable straps may be used to immobilize the forearm for IV and arterial-catheter insertion as well as protect the site in combative patients. When superficial extremity veins are flat due to hypovolemia, the ER physician will cannulate femoral, internal jugular, or subclavian vessels.

Intravenous resuscitation with crystalloids, such as normal saline or lactated ringers solution, or blood transfusion is a life-saving task. Type O- trauma blood is reserved for hemorrhaging women of child-bearing age and women who are pregnant. Type O+ (universal donor) trauma blood is given to victims when typed or cross-matched blood is unavailable or waiting will hasten death by exsanguination.

The donning of gloves, protective eye wear, and often masks is essential during trauma care. Trauma victims are more likely to have HIV, hepatitis, or other diseases.<sup>1</sup> The nurse must coordinate and acquire laboratory samples, orchestrate patient transport, and monitor the timely retrieval of results. Laboratory tests are obtained to assess blood type and cross-match, beta human chorionic gonadotropin (pregnancy), electrolytes, coagulation studies, drug toxicities and levels, hematocrit and hemoglobin, and arterial blood gases. Often tetanus toxoid injections will be administered for injuries involving metal and organic debris. To determine volume and circulatory status, the nurse may insert a Foley catheter, unless prohibited by urological trauma. A Velcro leg holder, such as those supplied by Dale Medical Products, can secure the catheter without the hassle of adhesive tape.

X-ray confirms the diagnosis of bone fractures. Computed axial tomography (CAT or CT scan) provides more detailed imagery of soft-tissue injury than x-ray findings. Ar-

teriography is used for blunt or penetrating trauma to the chest, abdomen, and peripheral arteries to evaluate the presence of dissections and hematomas. Invasive diagnostic peritoneal lavage (DPL), although less often used, can identify intraabdominal bleeding that necessitates emergency laparotomy. Non-invasive sonography is the preferred method in many cases. Other non-invasive studies, such as Doppler, echographic, and ventilation/perfusion (V/Q) scans, corroborate presumptive diagnoses and govern therapeutic interventions.

Emergency nurses are responsible for acquiring personal information from trauma victims. The emergency record is a legal document, therefore data recording is crucial, particularly in homicide or assault cases. This flow sheet informs and directs subsequent care of services after the patient's transfer to another unit. His or her name, age, next of kin, allergies, pre-existing medical conditions, medications, mechanism of injury, transfusion preferences, living will or power of attorney status, presence of implants, and organ-donation wishes are key elements of the document. Rescue personnel or family members may provide some of this information to the nurse.

## Operating room

### Anesthesia

The anesthetist, whether nurse or physician, will provide the "4 As" of anesthesia: aeration (oxygen), analgesia (pain relief), amnesia (loss of memory), and akinesia (lack of movement). Concomitant anesthetic goals are to support cardiopulmonary, neurological, and organ function; preserve body heat; replace fluids; and correct metabolic imbalances. After monitors (e.g., ECG, pulse oximeter, blood-pressure cuff, arterial line, end tidal CO<sub>2</sub> (ETCO<sub>2</sub>)) are satisfactorily functional and the patient's IVs are patent, anesthesia begins. Aseptic scrubbing and draping ensues, followed by surgical incision and operative repair. A moribund patient – near death – may receive only oxygen and a paralyzing muscle relaxant for anesthesia. When the patient recovers hemodynamic stability, narcotics, benzodiazepines, and anesthetic gases will be administered to supplement the anesthetic.

### Nursing care

At level 1 trauma centers, operating-room (OR) nurses are alerted to the arrival of victims by emergency-room or air-rescue staff. Reports from the trauma scene guide the preparation of equipment and surgical instrument needs. Patients often have multiple system injuries, and surgeons from different specialties will work together on the same patient. Another crucial responsibility of the OR staff is to obtain blood products (e.g., packed cells, fresh frozen plasma, cryoprecipitate, and platelets) from the blood bank, which are then stored in a refrigerator or temperature-controlled cooler within a short distance of the OR for immediate access.

Aside from the crucial activity of orches-

trating myriad instruments with the surgeon ("scrubbing"), OR nurses must anticipate trends and organize intraoperative activities ("circulating"). Of great importance is the accurate documentation of intraoperative events. The trauma suite is a very noisy, chaotic, and high-tension environment! Instrument counts, medication inventories, and certification of blood products are a portion of the circulating nurse's responsibility. He or she monitors the sterile technique to prevent operative field contamination, while simultaneously adjusting equipment settings and function on grounding devices, lasers, coagulating/dessicating "Bovies", or suction canisters; relaying laboratory and pathology reports; and communicating with families. These nonsurgical responsibilities contribute significantly to positive prognoses for traumatized patients.

Hypothermia is detrimental to trauma patients. Keeping the patient warm is everyone's responsibility, even if the room temperature makes the staff uncomfortable. Hypothermia, defined as a body temperature <96.8°F (36°C) may cause coagulopathies, cardiac arrhythmias, and immunocompromise. Trauma rooms must be heated to 80°F or above to transmit ambient heat to the patient. IV fluids and blood products are warmed (40-41°C) before administration, as are anesthetic gases. Whenever possible, warm air-flow blankets are placed on the patient's body to reduce heat loss via convection, radiation, and evaporative or conductive mechanisms.

### Intensive care unit

Patient mobilization, expeditious removal of tubes, adequate nutrition, and acute rehabilitation are the goals of intensive care.<sup>7</sup> Each stage is dynamic and depends on the patient's diagnosis and response to interventions. Often, death occurs in the intensive care unit (ICU) days to weeks after the initial traumatic injury, secondary to sepsis and multi-organ failure.

Nurses vigilantly observe for signs and symptoms of organ dysfunction, as it arises from coagulopathy, infection, and systemic inflammatory response syndrome. Respiratory function, sustained by mechanical ventilation via endotracheal tube or tracheostomy, is managed with continual observation of pulmonary pressures, sputum production, blood gases, chest tube drainage, and pulmonary toilet. A-lines, ECG, pulse oximetry, Swan-Ganz cardiac and Camino intracranial pressure cath-



eters are continually monitored to determine cardiopulmonary and neurological homeostasis. Feeding and nasogastric drainage tubes are checked for patency and function. Securement of gastrostomy and jejunostomy tubes or Jackson-Pratt type drains can be managed with the drainage bulb holder (Dale Medical Products), which replaces tape or safety pins, to prevent their dislodgement.

Blood products and fluids are given according to specific needs, as discerned by coagulation studies (Pt/Inr/Ptt; CBC; Fibrinogen; D-dimer), cardiopulmonary pressures (wedge, cardiac output), and hemodynamic status. Nurses manipulate various intravenous sympathomimetic infusions to tightly regulate blood pressure, heart rate, renal perfusion (urine output), and intra-cardiac pressures. Infusions of mannitol may be used to control cerebral edema. Muscle relaxants provide akinesia to augment pulmonary compliance and reduce metabolic expenditure. Propofol, morphine, and fentanyl infusions provide analgesia.

Nurses assume that patients can hear and perceive their environment while in an unconscious state after trauma or when in a drug-induced coma. Comfortingly they communicate with patients, telling them the date and time, what they are doing, who has been to visit, etc.

### Tube removal

As organ function returns to normal, drainage tubes will be removed. Satisfactory blood gas levels and spontaneous, adequate, unassisted ventilation leads to tracheal extubation. Adequate urine output and satisfactory hemodynamic function supports removal of urethral drainage catheters. Revival of peristalsis, flatus, and bowel function heralds the removal of nasogastric tubes. Cardiac, multiple lumen, and arterial catheters may be withdrawn when hemodynamic mechanics are acceptable and sustained without sympathomimetic augmentation (dopamine, Dobutrex®, Neo-Syneprine®, nitroglycerine,

Nipride®, etc.)

Other ICU nursing interventions include wound management, laboratory drafts, provision of hygiene, maintenance of skin integrity, and range-of-motion exercises. Additional activities include documentation, preceptorship of health-care personnel, interfacing with support services, and family communication and education.

### Nutrition

A formal nutritional assessment evaluates visceral protein, somatic protein, and fat reserves. It ascertains gastrointestinal function, daily caloric and protein requirements, body mass index, and the specific needs of particular injuries.

Nutrition is provided parenterally or enterally. Total parenteral nutrition (TPN) is administered via a central line when patients cannot consume substrates enterally and when long-term therapy is required. Peripheral parenteral nutrition (PPN) is used when supplementation is required for less than 10 days.<sup>6</sup>

Enteral diets for administration via feeding tubes include<sup>6</sup>:

- intact protein + lactose free
- intact protein + lactose free + high density
- blended + meat-based
- elemental pure amino acids
- polypeptides, and
- formulated for hepatic, pancreatic, pulmonary, or renal organ failure

Management of nutritional infusions via central lines or peripheral administration catheters, monitoring the infection potential of indwelling catheters, and maintenance of dressings are the responsibility of the ICU nurse. The composition of solutions, therapy orders, tapering, and weaning of parenteral nutrition are decided by the nutritionist and attending physician. Electrolyte and blood glucose levels must be carefully noted by all care providers to prevent hypo- or hyperglycemia.

### Convalescence

Convalescence begins when the patient is relocated to a medical or surgical ward. In that milieu, the patient gradually returns to fundamental activities of daily living (ADLs). Feeding, bathing, walking, bowel and bladder function, and recovery of circadian sleep patterns are among the major tasks of convalescence. Some catheters, IVs, tubes, and devices may remain in situ, so the attending nurse will still need to manage and observe them. Nursing assistants or family members may help the patient with ADLs, thus forging an opportunity for patient and family education about medications, treatments, and rehabilitation. After satisfactory recuperation, the patient will be discharged to home or a rehabilitation facility. Often, a follow-up visit by a home health nurse is arranged to assess problems of adjustment or recovery.

### Rehabilitation

### Psychological

Of paramount concern in a traumatized patient is the development of psychological conditions, which may or may not manifest in hospital. Reactions to traumatic experiences tend to be short-lived, but prolonged or excessive maladaptation to trauma requires psychiatric rehabilitation.<sup>19</sup> Post-traumatic sequelae may arise from problems existing before trauma, may be related to the effects of trauma, or may follow stressful medical, surgical, or rehabilitative procedures.<sup>9</sup>

Pre-existing psychological problems may stem from alcohol and substance abuse. Anxiety disorders, affective illnesses, and lack of adjustment may emerge when cognitive function normalizes.<sup>9</sup>

Psychological disturbances attributable to trauma include<sup>9</sup>:

- survival guilt
- phobic avoidance (isolation, withdrawal)
- bereavement
- loss of future plans; loss of limbs; loss of function
- sleep problems
- hypervigilance
- dissociation

Some post-traumatic stress is related to the surgical or ICU experience. Sleep deprivation, terror from the pain of procedures, drug effects, inability to communicate (secondary to paralysis while on ventilator), and disorientation are responsible. Other sources are worries about child care, financial crises, adverse physical and social outcomes, and generalized uncertainty.

No specific treatment exists for psychological trauma.<sup>9</sup> Careful diagnosis and treatment of coexisting psychiatric disorders are major focuses of attention.<sup>9</sup> Patient and family education enhances recovery. Education should begin in the emergency room with explanations about procedures and outcomes.<sup>9</sup>

More intensive therapies use desensitization techniques and, if necessary, hospitalization to treat severe psychological symptoms. Counseling and group therapy with specialists in post-traumatic stress management is helpful.

Mental health-care workers at disaster sites assist people suffering from acute traumatic stress by implementing *critical event debriefing*. Rescuers, survivors, and witnesses of traumatic events need someone to listen to their stories. Debriefing teams identify people at risk and offer help. Debriefers listen and reassure people that they are responding normally to tragedy. A primary goal is to inform the victims about delayed feelings that may arise days or weeks after the disaster. Follow-up meetings are encouraged to assess the victim's level of distress.

While in hospital, patients may experience intrusive thoughts, fear of returning to work, and fear of people.<sup>9</sup> They may perceive themselves as cowardly or weak. Survival guilt

may haunt some patients.

Critical event debriefing minimizes the development of post-traumatic stress disorders. Being made aware of particular psychological response mechanisms and symptoms may enable patients to seek help before maladjustment arises.

### Home care and physical rehabilitation

Rehabilitation is a restorative process that helps patients to regain independence and reintegrate the biopsychosocial, vocational, physical, and mental functions that existed prior to traumatic injury.<sup>10</sup> Rehabilitation services in America emerged after World Wars I and II,<sup>10</sup> when more than 5,000 amputees and over 265,000 soldiers who had sustained combat injuries returned home. To meet their needs, the U.S. government, together with volunteer agencies, promulgated rehabilitation services for disabled veterans. Consequently, rehabilitation services for civilians soon emerged.<sup>10</sup>

Rehabilitation services are multidisciplinary, not only involving medical diagnosis and nursing care but social services, counseling, pharmacy, nutrition, speech, physical, and vocational therapists.<sup>11</sup> Financial and legal advisors, equipment suppliers, and, most importantly, the patient's family are integral parts of this multifaceted team.

Physical rehabilitation begins in hospital. Based on the patient's records, the home-care nurse evaluates the patient's current level of self-care and needs, then plans and implements an effective strategy for physical and psychological rehabilitation. This effort is coordinated with all members of the multidisciplinary team.

Severely burned or spinal cord-injured patients require very intensive rehabilitation in centers specifically designed for such an activity. Other appropriate settings for rehabilitation are in hospital, within long-term nursing-care facilities, outpatient centers, and at home.

Waters, Sie, and Adkins<sup>11</sup> define the home activities to which general rehabilitation is directed. They are activities of mobility (from bed to wheelchair, toilet, and car); ambulation (with or without assistance); and self-care (grooming, feeding, toilet care, dressing, and bathing). Specialized tasks may be directed toward the recovery of vision or adaptation to blindness, communication (speech or use of speaking tools), and the maintenance of cognitive integrity.

Teaching and skill development are integral to developing responsibility for self-care of tracheostomies, medications, stomal feedings, and prostheses. Reducing stress to alleviate anxiety and dyspnea as well as the frustration of having a dependent or disabled role must be addressed.

Clemen-Stone et al<sup>10</sup> state that rehabilitative care begins with the involvement of the patient's family and health-care provider, then moves toward the patient's assumption of

maximal self-management. These goals are achieved through communication between team members, the revision of plans, when necessary, and the use of special resources (medical equipment suppliers, religious counselors, social services, etc.).

Rehabilitation can be a long process for the traumatically injured person. It affects the patient, family, health-care providers, the economy, and society. From a pragmatic perspective, resources for proper rehabilitation are shrinking. In today's restrictive economic climate, many people are not receiving ideal rehabilitative care, equipment, or interventions. Furthermore, people of all ages need recuperative care – from premature neonates, at home for the first time, to senior citizens of fragile and impoverished means, who can no longer live independently. In these situations, some rehabilitative nurses may become frustrated, but most find great satisfaction and enjoy numerous small victories, when brainstorming over rehabilitation dilemmas.

Dedication to patient care, despite mounting difficulties, evokes new strategies and creative alternatives. Nurses still have a calling – reinforced with expert skills, the gift of curing, and the care to make a difference.

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After reading this article, the learner should be able to:

- Describe social and political factors that have led to the evolution of trauma therapy and its incidence.
- Define the scope of trauma.
- Describe crucial interventions for the rescue of traumatized victims.
- Identify goals for nursing care of the traumatized patient in the ER, OR, and ICU.
- Define strategies for psychological and physical rehabilitation before and after hospital discharge.

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**1. The purpose of the Emergency Services System Act is to:**

- a. integrate a national trauma management system
- b. devise plans for national emergencies
- c. fund emergency preparedness organizations
- d. all of the above

**2. Trauma is responsible for more deaths than disease among the following age group:**

- a. 65-74
- b. 55-64
- c. 45-54
- d. 1-44

**3. During triage, the victims most likely to benefit from intervention:**

- a. are unconscious
- b. are children
- c. are trapped
- d. can verbalize their agony

**4. Prompt resuscitation of hospitalized victims enhances survivability if the victim is:**

- a. transported to a Level II trauma center.
- b. treated within the first hour of trauma
- c. alive
- d. kept eutermic

**5. Goals of intensive care unit nursing are to :**

- a. mobilize the patient, remove tubes, provide nutrition, begin acute rehabilitation
- b. initiate bowel and bladder training, teach wound care, start occupational therapy
- c. involve family members with feeding, medication administration, dressing changes
- d. provide pulmonary toilet, begin early physical therapy, maintain skin integrity

**6. Total parenteral nutrition is used:**

- a. before peripheral parenteral nutrition
- b. only for 10 days or less
- c. is better than enteral feedings
- d. for long-term nutritional therapy

**7. Post traumatic stress disorder is generally caused by:**

- a. underlying psychiatric instability
- b. substance abuse, alcoholism, and depression
- c. unresolved responses to physical and psychological trauma
- d. Painful ICU activities and sleep deprivation

**8. Psychological disturbances related to trauma include:**

- a. avoidance of phobia
- b. nonbreavement
- c. inappropriate survival
- d. dissociation

**9. The goals of rehabilitation are achieved by:**

- a. nurse-led initiatives
- b. adherence to plans for rehabilitation
- c. foregoing the use of special resources
- d. none of the above

**Mark your answers with an X in the box next to the correct answer**

1    A B C D E

3    A B C D E

5    A B C D E

7    A B C D E

9    A B C D E

2    A B C D E

4    A B C D E

6    A B C D E

8    A B C D E

**Participant's Evaluation**

1. What is the highest degree you have earned?      1. Diploma      2. Associate      3. Bachelor's      4. Master's      5. Doctorate  
 Using 1 =Strongly disagree to 6= Strongly agree rating scale, please circle the number that best reflects the extent of your agreement to each statement.

**Strongly Disagree**

**Strongly Agree**

2. Indicate to what degree you met the objectives for this program:

■ Describe social and political factors that have led to the evolution of trauma therapy and affect its incidence	1	2	3	4	5	6
■ Define the scope of trauma.	1	2	3	4	5	6
■ Describe crucial interventions for the rescue of traumatized victims.	1	2	3	4	5	6
■ Identify goals for nursing care of the traumatized patient in the ER, OR, and ICU.	1	2	3	4	5	6
■ Define strategies for psychological and physical rehabilitation before and after hospital discharge.	1	2	3	4	5	6

3. Have you used home study in the past?     Yes     No

4. How many home-study courses do you typically use per year?

5. What is your preferred format?     video     audio-cassette  
     written     combination

6. What other areas would you like to cover through home study?

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