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## Review

# Management of the lower gastrointestinal system in burn: A comprehensive review

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## ABSTRACT

**Background:** Burn produces complex gastrointestinal (GI) responses. Treatment, including large volume fluid resuscitation and opioid analgesia, may exacerbate GI dysfunction. Complications include constipation and opioid-induced bowel dysfunction (OBD), acute colonic pseudo-obstruction (ACPO), bacterial translocation and sepsis, and abdominal compartment syndrome (ACS). Contamination of perineal burns contributes to delayed healing, skin graft failure and sepsis and may impact upon morbidity and mortality. The authors carried out a literature review on management of the lower GI system in burn. This study aimed to explain: current prevention and treatment modalities; drawbacks and complications associated with available treatments, and to provide direction for development of best practice guidelines. ACS is associated with high mortality and should be treated with careful fluid resuscitation and diuresis, to minimise and remove oedema.

**Methods:** A comprehensive search of English language literature was performed on PubMed, Medline and Embase. Both MeSH and keywords searches were used.

**Results:** Evidence available on the management of lower gastrointestinal system in burn is summarised. Levels of evidence available are generally low (level III–IV).

**Conclusion:** Structured, graded interventions are required for prevention and treatment of constipation and OBD. Correction of electrolyte imbalance, adequate enteral intake and mobilisation are pre-requisites. Laxatives should be used according to World Gastroenterology Organisation recommendations. Resistant constipation may respond to changes in medication, but ACPO should be suspected and treated when present. Other complications, such as bacterial translocation and ACS are common in major burns. There is evidence that selective digestive tract decontamination reduces mortality and infectious episodes in major burns. ACS is associated with high mortality and should be treated with careful fluid resuscitation and diuresis. Surgery is reserved for non-responsive and severe cases. Perineal burns present challenges in wound and bowel management. Faecal management systems and negative pressure wound therapy (NPWT) may improve wound control and hygiene, but diversion colostomy will still be beneficial in some cases. There is a clear need for rigorous studies to guide practice more effectively in these challenging conditions.

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## 1. Introduction

Burn is a major cause of death and disability. In 2012/2013, burn led to 109,703 emergency attendances and 11,903 hospital admissions in England [1,2]. Burns induce complex systemic and local inflammatory responses, which may result in multisystem organ dysfunction [3].

Gastrointestinal (GI) dysfunction is common in patients with burn, resulting in complications such as acute colonic pseudo-obstruction (ACPO), sepsis and abdominal compartment syndrome [4–6]. Faecal contamination of perineal burns may give rise to complications including delayed healing, graft failure and sepsis. Management of GI function in the setting of burn is complex and challenging. Generally agreed guidelines that may direct management and improve outcomes, currently, do not exist.

Complex burn-related systemic inflammatory responses produce varied end-organ effects. In the GI system, burn results in increased gastric secretions, reduced intestinal motility, decreased nutrient absorption, increased GI mucosal permeability, bacterial translocation, increased intra-abdominal pressure, mucosal ulceration and GI haemorrhage [3–5]. These effects produce constipation, ACPO, sepsis and abdominal compartment syndrome.

The authors reviewed the GI effects of burn and the principles of management in its complications, including constipation and opioid-induced bowel dysfunction (OBD), ACPO, bacterial translocation and sepsis, and abdominal compartment syndrome. Advances in the management of perianal burns, in relation to bowel function, are also discussed.

## 2. Method

The authors performed a comprehensive search of the current literature on the following databases: PubMed, Medline and Embase. MeSH term was used on PubMed and keyword search was used on all the databases. Publications between 1974 and 2014 were included in the literature search. Searches were

performed by one author (JN) and full text articles were retrieved when possible. Systematic reviews, randomised controlled trials, observational studies and studies of equal level of evidence were summarised. When these were unavailable, case series were included. Studies already included in systematic reviews were not reviewed and non-English articles were excluded. The MeSH terms and keywords used (Fig. 1) are summarised.

## 3. Constipation and opioid-induced bowel dysfunction

Constipation in burn-injured patients is very common and multifactorial in causation. Trexler et al. [7] described a high prevalence (36.1%) of late defaecation (absence of defaecation within 6 days of ICU admission) in critically ill, thermally injured adult patients. This study also showed that late defaecation may reflect global GI tract motility dysfunction, demonstrated by increased episodes of constipation after first defaecation, feeding intolerance, and total parenteral nutrition (TPN) use in the late defaecation group [7].

Opioid analgesia, electrolyte imbalances including hypokalaemia, prolonged immobility, abdominal trauma, sepsis and surgery are factors which can result in reduced GI motility and constipation in burns patients [8].

Thorough clinical assessment should be performed when constipation occurs in burns patients, to exclude serious complication such as acute colonic pseudo-obstruction (ACPO). Careful examination of the abdomen and digital rectal examination must be performed to identify signs of distension, peritonism and faecal impaction. Review of observation charts and drug charts should be undertaken to monitor physiologic trends and avoid excessive narcotic use which may exacerbate constipation. ACPO and bowel obstruction should be suspected in constipated burn patients who are unwell with colicky abdominal pain and abdominal distension [8]. These processes must be ruled out as they closely mimic clinical features of constipation.

The World Gastroenterology Organization (WGO) recommends using a tiered approach to the management of

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