

The value of bowel sound assessment in predicting feeding intolerance in critically ill patients

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Abstract

Background: Early nutritional support in critical illness is important. There exists a debate about whether and when to initiate enteral nutrition as opposed to feeding parenterally. In addition to other indicators, nonspecific indicators such as bowel sound are used in the decision, but there is little evidence to show the value of bowel sound.

Methods: Feeding intolerance was assessed and correlated with the presence or absence of bowel sound as documented by the bedside nurse in 203 critically ill patients who were fed enterally for >48 hours at King Fahad National Guard Hospital in King Abdulaziz Medical City, Riyadh, Saudi Arabia.

Results: The absence of bowel sound in critically ill patients was associated with low caloric intake and with feeding intolerance. However, a large proportion of patients with absent bowel sound delayed feeding especially if this assessment was performed prior to initiating enteral feeding.

Conclusions: This study demonstrates weak correlation between bowel sound and caloric intake and feeding intolerance. Therefore, a decision regarding the initiation of enteral nutrition may not be based solely on the assessment of bowel sound and other nonspecific indicators.

Key words: Feeding intolerance, bowel sound, enteral, nutrition, critical, Riyadh, Saudi Arabia.

Background

The systemic inflammatory response in critical illness is coupled with complications of increased infectious

morbidity and multiorgan dysfunction. Studies have shown positive patient outcome can be achieved by conferring early nutritional support (NS), primarily by the enteral route. This therapeutic strategy has established a reduction in disease severity and subsequent complications thereby decreasing morbidity and mortality associated with critical illness. Such a measure has been known to decrease length of stay in the ICU and to reduce overall cost. (1)

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Enteral or parenteral nutrition?

In the early 1970s, clinicians treating patients with critical illness were of the view that the gut remained in a latent stage without adequate function. As a result, enteral nutrition (EN) was delayed until gut function was established. However, by the late 1970s, researchers were able to appreciate resuscitation mechanisms and the way in

which the body reacted to conditions of stress. This paved the way for providing early nutrition among such patients. Thus, parenteral nutrition (PN) was adopted as a standard procedure in critically ill patients.

A decade later, many studies emerged that provided evidence that EN had unequivocal physiologic advantages over PN. These included the facts that substrates entering directly via the enteral route are better utilised by the body; EN was not associated with glucose intolerance unlike PN; (2,3) and that the gut is a “metabolically active, immunologically important, and bacteriologically decisive organ in the critically ill.” (4,5) The current thinking is that EN and PN are not mutually exclusive, and that critically ill patients requiring NS should be fed according to the functional status of the gastrointestinal tract. (6) It is therefore, appropriate that critically ill patients undergo a complete nutritional assessment for nutritional ‘risks and needs’. Almost always, when NS is needed, the recommended guideline from the American Society for Parenteral and Enteral Nutrition (ASPEN) is that EN is preferred over PN.

The role of bowel sound and peristalsis

Listening for bowel sound (BS) is a tool that has been long used as an aid in determining whether an ICU patient is ready for initiation of oral or enteral feeding. This follows the idea that BS is an indication of peristalsis and that, therefore, the lack of BS would indicate aperistalsis. (7) However, the basis for BS is the air-fluid interface moving through the bowel. Thus, it naturally follows that if there is no air in the bowel, there will be no BS. Bowel sound is nonspecific markers; they can reflect the presence of air in either the small bowel or in the colon. In the presence of an ileus, BS can either be absent or hypoactive. As a result, BS is not an accurate or definite indicator of peristalsis. (7)

Bowel sound and the initiation of enteral nutrition

The initiation of EN in critically ill patients has been widely debated. (8) Intensive care unit (ICU) policy guidelines often mention the utility of BS, while also indicating a lack of certain knowledge about that utility. (9) It is very pertinent to our interest here that while the use of BS as an indicator is common, there are no prospective, randomized

clinical trials that have compared patients in whom EN has been initiated with or without BS, and the corresponding clinical outcomes. (7) From all available material, the belief that the value of BS as a predictor of a successful EN regime has been studied well in the context of patients in intensive care. This formed the basis of the present study.

We studied enterally fed ICU patients in whom an assessment of nurse documented BS was conducted prior to and after initiation of EN. The observed values of feeding intolerance and caloric intake were found to be different across patients classified on the basis of BS assessment.

Patients

Two hundred and three ICU patients at King Fahad National Guard Hospital in King Abdulaziz Medical City, Riyadh, Saudi Arabia, who were fed enterally for a period of >48 hrs were included in the study, which lasted 1 year.

We excluded patients with Do-Not-Resuscitate (DNR) status, brain-dead patients, and re-admissions.

Methods

Patients’ demographics, including height, weight, and caloric requirements were documented. For the first 5 days on EN, caloric intake was recorded. Feeding intolerance was defined as having 2 episodes of gastric residuals of >150 ml, or 2 episodes of vomiting.

BS was assessed and documented by the bedside nurse as absent, diminished, or normal, before and after initiation of EN.

For the analysis, we used ANOVA, and the chi-square test as opposite. Univariate analysis was performed. Results were expressed as odds ratios (OR) and 95% confidence intervals (95% CI).

Results

Before the initiation of EN, BS was documented as absent in 8% of patients, diminished in 41%, and normal in 51% of patients.

Absence of BS: significance

The documented absence of BS was strongly associated with the use of narcotics (OR=4.44; 95% CI=0.98-20.12; p=0.05) and the use of vasopressors (OR=3.54; 95% CI=1.18-10.62; p=0.024).

Feeding intolerance

Feeding intolerance occurred in 38% of patients with documented absence of BS before initiation of EN. After the initiation of EN, the absence of BS was more highly associated with feeding intolerance. **Figure 1** shows the relation between bowel sound and feeding intolerance.

Caloric intake

Caloric intake as a percentage of requirement was significantly lower in patients with documented absence of BS (42%±26%), compared with patients with diminished BS (59%±23%; p=0.035) or normal BS (58±23%; p=0.035). **Figure 2** shows the relation between bowel sound and caloric intake.

Discussion

While the usual assumption is that BS correlate with peristalsis, many experts believe that EN can safely be initiated even when BS are absent. (7)

This belief is reflected as a Grade B recommendation in the Society of Critical Care Medicine (SCCM) and the ASPEN guidelines for the provision and assessment of nutrition support therapy in the adult critically ill patient. (10) The recommendation is that *“In the ICU patient population, neither the presence nor absence of bowel sound nor evidence of passage of flatus and stool is required for the initiation of enteral feeding.”*

At least 75 percent of the critically ill patients admitted to the ICU will have some gastrointestinal dysfunction. This is directly proportional to the level of injury and the resultant metabolic state of the patient. (11) The functional state of

the bowel is independent to that of the contractility prowess of the bowel. Multiple randomised clinical trials describe a success rate of 30-85% in which patients can achieve their nutrition goals within the first 72 hours. (12)

Feeding intolerance resulting in vomiting, nausea, abdominal pain accompanied by distension, constipation, and diarrhoea pose a major challenge observed with EN. In our study, evidence points to a weak correlation between the absence of BS and feeding intolerance. This may now be seen in contrast to the above-expressed idea of the lack of any real value of an observation of absent BS. In identifying factors associated with initiation of, and tolerance to EN, Heyland et al found in 99 ICU patients that the absence of BS accounted for 27.0% of decisions to not initiate EN, while the presence of BS made initiation of EN more likely. (13)

In our study, the documented absence of BS in critically ill patients was associated with low caloric intake in addition to being weak with feeding intolerance. This association appears stronger if the absence of BS persists after the initiation of EN.

One must keep in mind that the assessment of bowel sound is subjective and might be influenced by the perceived ability of the patient to tolerate feeding. In our observational study, the BS was assessed by the same nurse administering enteral feeding. As such, the assessor was not blinded to the intervention. In addition, the absence of bowel sound may just indicate that the bowel is not functioning because of lack of feeding. In fact, our data suggests that feeding stimulated BS.

Conclusions

This study demonstrates that the documented absence of BS was associated with weak feeding intolerance. The absence of bowel sound was common with the use of opioids and vasopressors. However, the absence of BS was more predictive of feeding intolerance after initiating feeds suggesting that enteral feeds should not be held based on absence of BS alone.

Figure 1. The relation between bowel sound and feeding intolerance

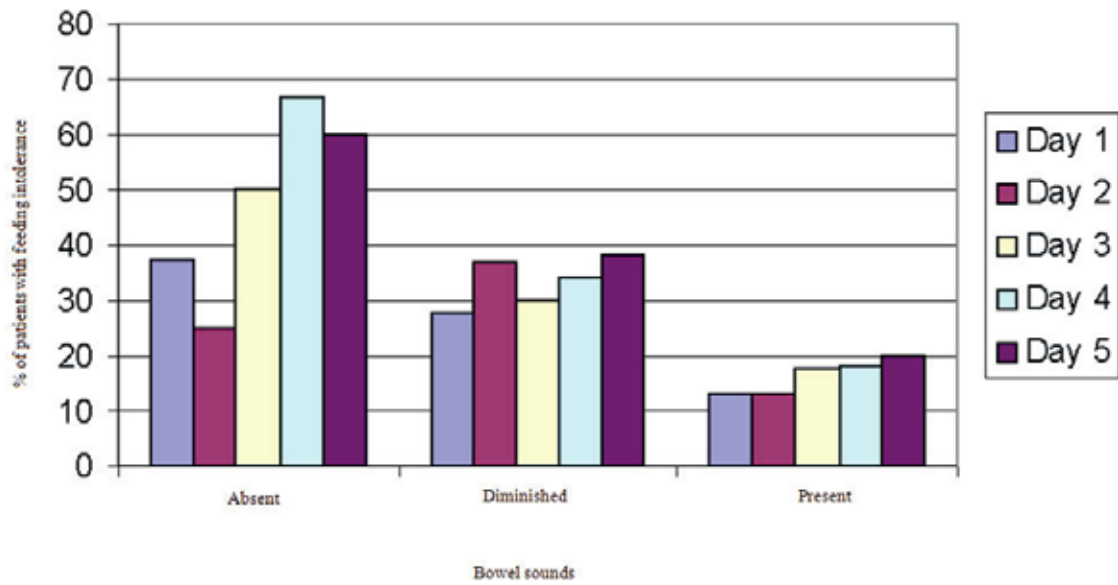
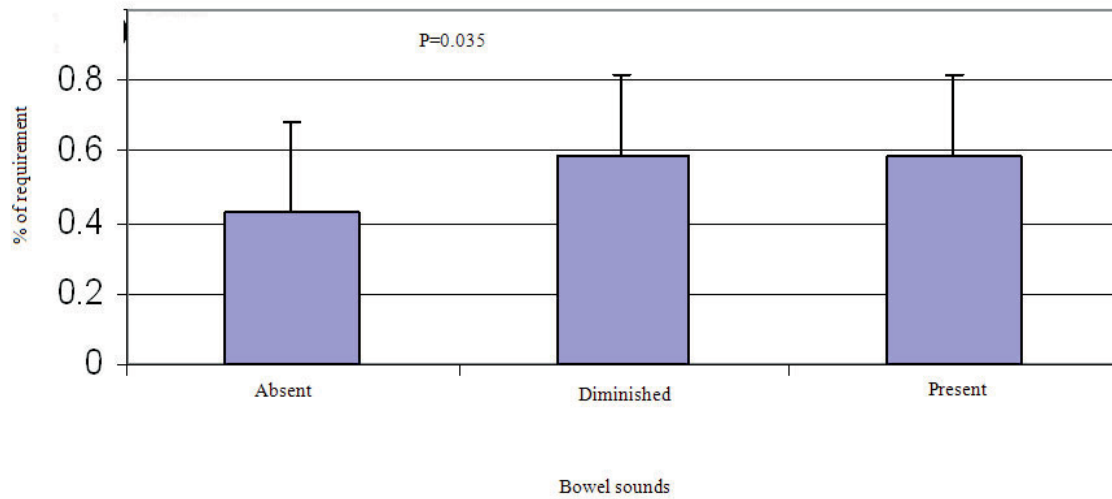


Figure 2. The relation between bowel sound and caloric intake



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