



**Figure 6.** Feeding protocol vs control, infections.

GRVs does not protect the patient from these complications. Use of GRVs leads to increased enteral access device clogging, inappropriate cessation of EN, consumption of nursing time, and allocation of healthcare resources and may adversely affect outcome through reduced volume of EN delivered.<sup>110</sup>

Three studies have shown that eliminating the practice of using GRVs improves delivery of EN without jeopardizing patient safety.<sup>110–112</sup> All 3 trials—2 RCTs<sup>110,112</sup> and 1 prospective before/after implementation trial<sup>111</sup>—showed no significant difference between groups with regard to pneumonia. Two of the trials showed significantly greater EN delivery, by either increased volume of EN infused<sup>111</sup> or greater reduction in energy deficit.<sup>112</sup> One trial showed significantly more vomiting but significantly better overall GI tolerance when GRVs were eliminated,<sup>112</sup> while a second trial showed no difference in vomiting between groups.<sup>111</sup>

If the practice of GRVs is eliminated, a number of alternative strategies may be used to monitor critically ill patients receiving EN: careful daily physical examinations, review of abdominal radiologic films, and evaluation of clinical risk factors for aspiration. EN protocols should be initiated, and efforts to proactively reduce risk of aspiration pneumonia should be made (see sections D3 and D4). For those ICUs reluctant to stop using GRVs, care should be taken in their interpretation. GRVs in the range of 200–500 mL should raise concern and lead to the implementation of measures to reduce risk of aspiration, but automatic cessation of EN should not occur for GRVs <500 mL in the absence of other signs of intolerance.<sup>80,102–104,109</sup>

*Question:* Should EN feeding protocols be used in the adult ICU setting?

**D3a. We recommend that enteral feeding protocols be designed and implemented to increase the overall percentage of goal calories provided.**

[Quality of Evidence: Moderate to High]

**D3b. Based on expert consensus, we suggest that use of a volume-based feeding protocol or a top-down multistrategy protocol be considered.**

**Rationale:** Use of ICU- or nurse-driven protocols that define goal EN infusion rate, designate more rapid start-ups, and provide specific orders for handling GRVs, frequency of flushes, and conditions or problems under which EN may be adjusted or stopped has been shown to be successful in increasing the overall percentage of goal energy provided.<sup>80,113–117</sup> In addition, volume-based feeding protocols in which 24-hour or daily volumes are targeted instead of hourly rates have been shown to increase volume of nutrition delivered.<sup>116</sup> These protocols empower nurses to increase feeding rates to make up for volume lost while EN is held. Top-down protocols use multiple different strategies simultaneously at the time of initiation of EN to enhance tolerance and increase delivery of EN, removing individual strategies as tolerance improves over the first few days of infusion. Top-down multistrategy protocols typically use volume-based feeding in conjunction with prokinetic agents and postpyloric tube placement initially (among other strategies), with prokinetic agents stopped in patients who demonstrate lack of need.<sup>116</sup>

By aggregating the data from 2 studies that met our inclusion criteria (Figure 6), use of nurse-driven EN protocols to increase EN delivery positively impacted patient outcome by reducing the incidence of nosocomial infections as compared with controls where no protocol was used (RR = 0.59; 95% CI, 0.43–0.81; *P* = .001).<sup>80,116</sup>

*Question:* How can risk of aspiration be assessed in critically ill adults patients receiving EN, and what measures may be taken to reduce the likelihood of aspiration pneumonia?

**D4. Based on expert consensus, we suggest that patients receiving EN should be assessed for risk of aspiration and that steps to reduce risk of aspiration and aspiration pneumonia should be proactively employed.**

**Rationale:** Aspiration is one of the most feared complications of EN. Patients at increased risk for aspiration may be identified by a number of factors, including inability to protect the