# Outcomes with the Use of Feeding Tubes

Review of articles in the medical literature with annotation

1.Grant MD, Rudberg MA, Brody JA. Gastrostomy placement and mortality among hospitalized Medicare beneficiaries. JAMA 1998;279:1973-1976.

This article reviewed the outcome of 81,105 older Medicare beneficiaries who were discharged from hospitals in 1991 with gastrostomies. The mean age for men in this study was 78.4 years and for women was 81.8 years. Cerebral vascular disease, cancer, fluid and electrolytes disorders, and aspiration pneumonia were the most common prior diagnoses in these patients. Thirty days after placement of a feeding tube, 23.9% of the patients were dead. At the end of a year, 63% were dead. At the end of three years, 81.3% were dead. The authors conclude that "When an older individual fails to eat, these mortality results could help inform the decision to place a gastrostomy. The substantial mortality rates may be reason to consider that some enterally fed patients who do not have swallowing disorders are not dying because of lack of nutrition, but rather, lack the need to eat because they are dying. Enteral feeding is at times a life-saving procedure (for example, in older individuals with dysphagic stroke or not eating because of severe depression). Yet for others, gastrostomy placement appears to portend spending the final weeks or months of life artificially feed. The mortality and placement rates among these Medicare beneficiaries emphasize the need to critically exam potential benefits and risks of enteral feeding by gastrostomy in older individuals, particularly those nearing the end of life."

2.Finucane TE, Christmas C, Travis K. Tube feedings in patients with advanced dementia: A review of evidence. JAMA 1999;282:1365-1370.

This article reviews the evidence with regard to the use of feeding tubes in patients with advanced dementia. It specifically asks the following questions: Does tube feeding prevent aspiration pneumonia? Does tube feeding prevent the consequences of malnutrition? Is survival improved by tube feeding? Are pressure ulcers prevented or improved by tube feeding? Is the risk of other infections reduced by tube feeding? Can tube feeding improve functional status? Does tube feeding improve patient comfort? The authors found no data that suggest that tube feeding improves any of the clinically important outcomes addressed by these questions, and they found some data that suggest adverse outcomes. Furthermore, they document substantial risks to tube feedings. They conclude that "The widespread practice of tube feeding should be carefully reconsidered, and we believe that for severely demented patients the practice should be discouraged on clinical grounds." They recommend "a comprehensive, motivated, conscientious program of hand feeding as the proper feeding."

3.McCann R. Lack of evidence about tube feeding–food for thought. JAMA 1999;282:1380-1381.

In this editorial accompanying the article by Finucane at al in JAMA, the author notes that abnormal swallowing is often a marker for severe, multisystem illness and carries a high mortality regardless of intervention with artificial feeding. He says that not eating may be one of the many facets of the dying process and not the cause. The editorialist reports the adverse effects of tube feedings including aspiration, obstruction of the feeding tube, and agitation. He notes that aspiration occurs in up to fifty percent of patients with feeding tubes regardless of whether nasogastric or gastric tubes are used. He also observes that the use of chemical and physical restraints is an often forgotten complication of tube feeding in patients who become agitated or attempt to remove a feeding tube. The author writes, "Given the lack of evidence that tube feeding makes patients live longer or improves quality of life and the known adverse affects documented in this article, clinicians and families should think carefully about the goals of therapy before initiating tube feeding. The goals should be in concert with patients' previously expressed values and wishes. Statements like 'We can't just let him starve to death' or 'If we

don't put this tube in, she will get pneumonia' need to be put into perspective and replaced with more meaningful, thoughtful, individualized approaches to care based on the available evidence of efficacy."

4.Gillick MR. Rethinking the role of tube feeding in patients with advanced dementia. N Engl J Med. 2000;342:206-210.

In this article, the author asked similar questions to those in the Finucane at al article: Do feeding tubes work in patients with dementia? Do feeding tubes promote the comfort of patients with advanced dementia? Is withholding artificial nutrition morally wrong? She notes that in 1995 gastrostomy tubes were inserted into 121,000 elderly patients in the United States; approximately thirty percent of these patients had dementia. The author reports that it is now clear from multiple observational studies that feeding tubes do not prevent aspiration in patients with dementia. She observes that it's been remarkably difficult to demonstrate difference in longevity between patients with feeding tubes and those without tubes. She notes that data collected over the past decade suggest that gastrostomy tubes are not necessary to prevent suffering and may actually cause suffering. The author concludes the following, "Gastrostomy tubes have not been shown to prolong life, insure adequate nutrition, or prevent aspiration, and there is neither a secular nor religious ethical imperative to use them. In addition they are not necessary to prevent suffering. Since there are few if any benefits and there is considerable potential for harm, the routine use of gastrostomy tubes in patients with severe dementia is not warranted. Physicians, professional organizations, hospitals, and nursing homes should recommend to patients and their families that nutrition be provided orally, not through a feeding tube, during the final stage of dementia." She provides this caveat: "There is just enough uncertainty associated with tube feeding, just enough chance that a tube might, in some unanticipated situations, prolong life or provide comfort in patients with dementia, that family members should be able to request a feeding tube *if they believe this truly is what the patient would have wanted.* However, if family members are unable to make a decision and if there are no extenuating circumstances, the physician should assume that a person with advanced dementia would not want a gastrostomy tube."

5.Callahan CM, et al. Outcomes of Percutaneous Endoscopic Gastrostomy among Older Adults in a Community Setting. J. Amer. Geriatrics Soc. 2000;48:1048-1054.

This article presents a prospective study of 150 patients' aged 60 years and older receiving Percutaneous Endoscopic Gastostomy (PEG) feeding tube insertions by gastroenterologists practicing in a community setting. The patients had a mean age of 79 years, and 56% were women. 83% were white. The cumulative illness rating skill for these patients was quite high indicating the high degree of burden of chronic illness among the patients. The most frequent indications for the PEG were stroke (41%), neurodegenerative disorders (35%), and cancer (13%). The thirty day morality after PEG placement was 22%, and the twelve-month mortality was 50%. Seventy-two patients survived at least two months; they were assessed for functional, nutritional, and self-report status. There were essentially no improvements in the mean values on any of these parameters after two months. As the authors note, "only rarely did patients experience improvement in functional or nutritional status." The authors note that PEG tubes are frequently inserted with the goals to improve nutrition, increase patient comfort, extend life, increase strength, and help patients overcome an acute illness. They write, "Data from the current studies suggest that there are only rare patients who achieve these goals." The authors conclude, "We were unable to document clinically meaningful benefits from PEG tube feedings in the majority of these patients. Whether the PEG tube feedings slowed the rate of their decline or prolonged an imminent demise is unclear from these data. Identifying clinical characteristics of older adults likely to benefit from PEG tube feeding will require larger prospective cohort studies."

6.Meier DE, Ahronheim JC, Morris J, Baskin-Lyons S, Morrison RS. High short-term mortality in hospitalized patients with advanced dementia: lack of benefit of tube feeding. Archives of Internal Medicine 2001; 161:594-599.

This study assessed long-term survival in 99 hospitalized patients with advanced dementia, the probability of feeding tube placement during the index hospitalization; and the influence of tube feeding on survival in this group. These patients had advanced dementia and were incontinent of bowel and bladder, had limited speech, and limited ability to walk and sit without assistance. The median age of the patients was 84 and 81% were female. Seventy percent resided in nursing homes prior to admission and 29% at home. At the time of admission 17% had a feeding tube in place. Sixty percent of the hospitalizations were for pneumonia or urinary tract infection. Another twelve percent of the admissions were for dehydration or a metabolic abnormality. Of the 82 patients without a feeding tube on admission, 62% had a PEG tube placed during the hospitalization. African American ethnicity (odds ratio 9.43) and residents in a nursing home (odds ratio 4.9) were significantly associated with receiving a PEG feeding tube during the hospitalization. There was no difference in median survival between those who did and did not receive a feeding tube. Those who received a feeding tube had a median survival of 195 days and those who did not receive a feeding tube had a median survival of 189 days. The authors concluded: "In a cohort of hospitalized patients with acute illness and advanced dementia, the risk of receiving a new feeding tube is high. With or without tube feeding, these patients have a 50% six-month median mortality, similar to that observed in a wide range of reports from other clinical settings." The authors also comment that hospitalization for patients with advanced dementia has not been demonstrated to improve clinical outcomes.

7.Mitchell SL, Teno JM, Roy J, Kabumoto G, Mor V. Clinical and organizational factors associated with feeding tube use among nursing home residents with advanced cognitive impairment. JAMA 2003;290:7380.

This article used two large data sets, the 1999 National Repository Resident Assessment Instrument Minimum Data Set and the On-Line Survey Certification of Automated Records (OSCAR) Data Set, to examine the use of feeding tubes in patients with a cognitive performance score of 6, which is the score for patients with very severe impairment with eating problems. Comatose residents were excluded. Overall, 34% of residents with advanced cognitive impairment had feeding tubes. The following resident characteristics predicted residents who were less likely to have a feeding tube: older age, white race, female gender, completion of advanced directives, a do not resuscitate order, and a diagnosis of stroke. The following factors identified facilities with a lower percentage of severally cognitively impaired residents with feeding tubes: not for profit status, rural area, fewer than 100 beds, presence of a special dementia care unit, and presence of a nurse practitioner or physician assistant on staff. In their discussion, the authors noted that DNR orders were associated with a lower likelihood of feeding use. The authors postulated, "….facilities with a greater overall rate of DNR orders may be more proficient at engaging surrogates in discussions that lead to decisions not use a feeding tube." The authors also noted a large variation among states and even within states with regard to the proportion of residents who were tube fed in nursing home facilities. The highest proportion of residents who were tube fed was in Washington, DC with 64%. The lowest proportion was in Maine with only 9%. West Virginia had 31% of residents with severe cognitive impairment being tube fed. To decrease the high proportion of feeding tube use in this population, the authors recommended the following: comprehensive implementation of advanced care planning; reimbursement policies that promote feeding by hand as opposed to feeding by tubes; the availability of special care units for dementia patients; and the presence of mid-level providers in nursing home facilities.

8.Williams LS. Feeding Patients after Stroke: Who, When, and How. Annals of Internal Medicine 2006;144:59-60.

This article is an editorial summarizing results of the Feed Or Ordinary Diet (FOOD) Trials. The FOOD trials sought to answer three questions about feeding after stroke: 1) Does routine oral supplementation in patients with stroke and no swallowing difficulties improve clinical outcomes? 2) Does early initiation of enteral tube feeding in patients with stroke and dysphagia improve clinical outcomes more than avoiding enteral tube feeding for at least 7 days? and 3) Does percutaneous endoscopic gastrostomy (PEG) tube feeding of patients with stroke and dysphagia improve outcomes more than nasogastric (NG) tube feedings? The author reports the answer to the first question is "no." Routine oral supplementation of a normal diet in stroke survivors who can swallow is not associated with improved six-month outcomes. In the second trial, there was no statistically significant survival benefit for early feeding. A sobering fact from the second trial was that 80% of patients in the trial either were dead or were severally disabled at six months. Early tube feeding in the second trial and nasogastric tube feeding in the third trial were not associated with an increased risk for aspiration pneumonia but were associated with a 2-3 fold increase in gastrointestinal bleeding. The author concludes as a result of reviewing these trial outcomes that "PEG tubes should, therefore, be reserved for patients with previous strokes who cannot swallow safely after two-three weeks of NG feeding." The author also notes that PEG tubes are safer than long-term nasogastric feeding.

9.The Food Trial Collaboration. Effect of timing and method of enteral tube feeding for dysphagic stroke patients (FOOD): A multicentre randomized trial. LANCET 2005; 265:764-772

This study had several arms and aimed to establish how the timing and route of enteral tube feeding after stroke affected patients' outcomes in six months. In one arm of the study, 859 patients were enrolled by 83 hospitals in 15 countries into the study in which patients with dysphagic stroke received an enteral feeding tube as soon as possible versus no enteral tube for at least 7 days after the stroke. In the second arm of the study, 321 patients were enrolled by 47 hospitals in 11 countries to receive either a PEG feeding tube or a nasogastric tube within three days of dysphagic stroke. The two questions which were being asked by this study were as follows: 1) does early initiation of enteral tube feeding improve outcomes; and 2) does enteral tube feeding via PEG rather than nasogastric tube improve outcomes? Statistically significant differences in outcomes were not found in either arm of the study. There was a nonsignificant reduction in the absolute risk of death in the early feeding versus avoid feeding for 7 days trial. In the PEG versus nasogastric trial, allocation to PEG feeding was associated with a nonsignificant increase in the absolute risk of death but an increase of borderline significance in absolute risk of death or poor outcome of 7.8% ($p=0.05$.) In neither trial were there significant differences between groups in the frequency of recurrent strokes, neurological worsening, pneumonia, urinary infection, or venous thromboembolism. However, the rate of gastrointestinal hemorrhage was higher in the early feeding group as opposed to the group in which a feeding tube was avoided for 7 days ($p=0.04$) and with nasogastric tubes rather than PEG tubes in the second arm of the study ($p=0.005$). The authors concluded, "We have not shown any significant differences in outcomes between early enteral tube feeding and avoidance of it." In the discussion, the authors also noted, "The survivors in the PEG group were also more likely to be living in institutions and had lower quality of life." The practical implication of this study is that there does not need to be a rush to start tube feeding in a patient immediately after he or she suffers a dysphagic stroke. Second, feeding by nasogastric tube for the first 2-3 weeks after stroke seems to be just as satisfactory as by PEG feeding tube."

10.Naik AD, Abraham NS, Roch VML, Concato J. Predicting which patients can resume oral nutrition after percutaneous endoscopic gastrostomy tube placement. Aliment Pharmacol Ther 2005; 21:1155-1161

The authors conducted a single-site observational study between December 1999 and April 2001 of all patients scheduled for percutaneous endoscopic gastrostomy (PEG) feeding tube placement. They enrolled 75 patients. The study sought to determine which clinical characteristics predict which patients will be able to resume normal oral feeding with removal of the PEG tube. In multivariable analysis, the authors found that age less than 65 years and a diagnosis of localized head and neck cancer predicted resumption of oral nutrition. The authors note that with prolonged PEG tube use, the following complications occur: aspiration pneumonia, gastric bleeding, need for physical restraints, and tube dysfunction and dislodgement that may require physical intervention as often as every 30 days. The mean age of the participants in this study was 64.7 years. Twenty-seven percent attainted the outcome of resuming oral nutrition with PEG tube removal. The average time to tube removal was 147 days. Thirty-seven percent of patients died within 4 months of PEG placement. Twenty-one patients (28%) were still receiving PEG tube feedings at the conclusion of the study which had a median follow up of 13 months. In their discussion, the authors noted that several longitudinal studies have found that 20-25% of patients are capable of resuming normal oral feeding after PEG tube placement. The authors concluded, "This paper addresses an important area of decision-making regarding gastrostomy tube placement; and, if these findings can be replicated, suggests that perhaps doctors should explicitly differentiate patients for whom PEG is a bridge to normal oral nutrition versus those requiring prolonged tube feeding. For this purpose, we demonstrated that few older patients with neurodegenerative diseases, strokes, or extensive malignancies at the time of PEG tube placement are likely to attain the clinical goal of resuming oral nutrition with consequent feeding tube removal. These patients and their family members should be counseled about the significant treatment burdens and risks that are associated with prolonged tube feeding. Further studies with a diversity of patients and additional candidate variables are needed to confirm and extend our results."

11.Ickenstein GW, Stein J, Ambrosi D, Goldstein R, Horn M, Bogdahn U. Predictors of survival after severe dysphagic stroke. J Neurol 2005; 252:1510-1516

The aim of the study was to quantify the recovery of swallowing function and to identify variables predictive of survival after dysphagic stroke requiring feeding tube placement. In this study, 11.6% of stroke patients admitted during the 3 year study period had severe dysphagic stroke with feeding tube placement. Follow-up was available for 66 of these patients. After mean follow-up of 2 years, 42 were still alive (64%) and 24 had died (36%). Of the 42 who were alive, the feeding tube had been able to be removed in 19. On logistic regression analysis, the absence of aspiration on videofluoroscopic swallowing study and feeding tube removal by time of discharge from the neurorehabilitation hospital (average stay in the rehab hospital was 57 days) were independent predictors of survival at the time of follow-up after severe dysphagic stroke. The authors conclude, "We found that this subpopulation of stroke survivors (severe dysphagic stroke) has a high mortality rate, and that survival in this population is predicted by measures which reflect the severity of dysphagia. This study shows that only 30% of patients with severe dysphagic stroke were able to have their feeding tubes removed. This information may be helpful to patients and families."

12.Casarett D, Capo J, Caplan A. Appropriate use of artificial nutrition and hydration – Fundamental principles and recommendations. N Engl J Med 2005;353:2607-2612. This article is a Sounding Board that appeared in the New England Journal of Medicine on December 15, 2005. It describes what was thought to be the general medical, ethical, and legal consensus with regard to the use of artificial nutrition and hydration that was challenged in the aftermath of the Terri Schiavo case. It also notes that financial incentives and regulatory concerns have encouraged the use of artificial nutrition and hydration

in a manner that may be inconsistent with medical evidence and the preferences of patients and their families. The article cites literature demonstrating that artificial nutrition and hydration may improve survival for patients who are in a permanent vegetative state; these patients may live for more than 10 years, but without it, the patients usually die within several weeks. The authors also note that parenteral artificial nutrition and hydration can prolong the lives of patients with extreme short-bowel syndrome, and tube feeding can improve the survival and quality of life of patients with bulbar amyotrophic lateral sclerosis. Artificial nutrition and hydration may improve the survival of patients in the acute phase of stroke or head injury and among patients receiving short-term critical care. It may also improve the nutritional status of patients with advanced cancer who are undergoing intensive radiation therapy. There is less evidence for the benefit of artificial nutrition and hydration for patients receiving chemotherapy for cancer. The authors note that "the bulk of available evidence suggests that artificial nutrition/hydration does not improve the survival rate among patients with dementia." The authors propose five recommendations to help ensure that patients and their families retain the right to make decisions about artificial nutrition and hydration. 1) Because of the inadequacy in the typical informed-consent process of discussion about artificial nutrition/hydration, all clinicians need to be better able to talk to patients and families about this issue. 2) Decision-making about artificial nutrition and hydration in nursing homes should be shielded from financial and regulatory pressures. Nursing homes should not be reimbursed at a higher rate for residents who are receiving artificial nutrition and hydration than those who are not. Publicly reported data on nursing homes which includes data about residents that lose weight should not include data for residents whose weight loss is the result of a choice to forgo artificial nutrition or hydration. 3) State laws should allow the same standard of evidence of a patient's preferences for decisions about artificial nutrition and hydration as they do for other decisions. These laws should allow families to make reasoned and caring decisions on the patient's behalf based on knowledge of the patient's values and preferences. 4) Attorneys, physicians, and other healthcare providers should encourage and help patients to complete advance directives and to include preferences about artificial nutrition and hydration in those advance directives. 5) Healthcare facilities should ensure that preferences are respected in all healthcare settings. The authors specifically recommend that nursing homes and hospitals should develop effective documentation strategies such as the Physician's Orders for Scope of Treatment (POST) form which ensures that a patient's preferences are clearly documented and readily available to guide the patient's care as the patient is transferred from one healthcare setting to another.

13. Palecek EJ, Teno JM, Casarett DJ, Hanson LC, Rhodes RL, Mitchell SL. Comfort feeding only: a proposal to bring clarity to decision-making regarding difficulty with eating for persons with advanced dementia. *J Am Geriatr Soc* 2010; 58:580-584.

The authors, a nationally respected panel of geriatricians, note that reduced oral intake is expected in advanced dementia not only due to eating problems, but also as a result of the physiological consequences of the disease. They cite a recent Cochrane systematic review of the medical literature which concluded that the use of feeding tubes, when compared with attempts at hand feeding, does not prolong survival for patients with advanced dementia. The research also shows that tube feeding does not prevent weight loss and malnutrition, heal pressure ulcers, or reduce the incidence of aspiration pneumonia. They observe that percutaneous endoscopic gastrostomy tubes (PEG tubes) are associated with numerous adverse effects with a complication rate of between 32 and 70%. Patients with dementia often require physical restraints or pharmacologic sedation to keep a PEG tube in place, and patients fed via PEG tubes are deprived of the pleasure of eating and the human interactions that hand feeding offers. The authors conclude that PEG feeding tube placement has no proven benefit for patients with advanced dementia. Despite the lack of evidence to support the use of PEG tubes, studies have shown up to a 10-fold difference in states in the prevalence of PEG tubes in patients with advanced dementia, suggesting that factors external to a patient's disease affect feeding tube decisions. They observed that when a decision is made not to insert a PEG tube, often an order for "no artificial hydration and nutrition" and

another order that says “do not tube feed” are issued. These orders are often interpreted as “no care” rather than focusing on what would be done through careful hand feeding to promote comfort and respect the wishes of the patient. The authors suggest a new order, “comfort feeding only,” with the goal of providing new language to reframe discussions and manage eating problems in patients with dementia. The authors state that there are two meanings to this order: first, comfort refers to the stopping point in feeding, emphasizing that the patient will be fed so long as it is not distressing; and second, comfort refers to the goal of the feeding. This order entails attempts to feed the patient regularly with cessation of oral feeding when the patient begins to show signs of distress such a choking or coughing. They hope that the language change will be useful not just to surrogate decision-makers but also to nursing homes and surveyors and anticipate that nursing homes will feel more comfortable in not putting in a feeding tube because surveyors can view hand feeding as a legitimate expression of the patient’s wishes.

14.Teno JM, Mitchell SL, Gozalo PL, Dosa D, Hsu A, Intrator O, Mor V. Hospital characteristics associated with feeding tube placement in nursing home residents with advanced cognitive impairment. JAMA 2010; 301:544-550.

This article was published as original research in JAMA February 10, 2010. The authors noted that two widely cited evidence-based literature reviews conclude that the use of feeding tubes in patients with advanced dementia does not improve survival, prevent aspiration pneumonia, heal or prevent decubitus ulcers, or improve other clinical outcomes. Nevertheless, a report from 2003 indicated that more than one third of nursing home residents with advanced dementia had feeding tubes inserted and used. The purpose of this study was to identify the characteristics of United States hospitals associated with higher rates of feeding tube insertion in nursing home residents with advanced dementia. The mean rate of feeding tube insertions per 100 admissions was 7.9 in 2000 and decreased to 6.2 in 2007. Statistically significant higher feeding tube insertion rates were associated with the following hospital characteristics: for-profit ownership; larger size (greater than 310 beds versus less than 101 beds); and greater intensive care use in the last six months of life for patients with underlying serious chronic illness. The authors observed that the results are the first to their knowledge to document the national variation in rates of feeding tube insertions among acute care hospitals. As they note, “Feeding tube insertion with persons with advanced cognitive impairment demonstrates the disconnect with existing evidence of their effectiveness.” They call for multifaceted educational interventions to ensure that the insertion of feeding tubes in patients with advanced dementia during acute care hospitalizations is consistent with patient preferences after a thorough informed consent discussion of the risks versus benefits of feeding tube insertion in this patient population. They also recommend future research to better understand why this large variation in feeding tube insertion occurs among hospitals.