

Critical Review:
Is Percutaneous Endoscopic Gastrostomy (PEG) tube feeding in patients with advanced dementia associated with survival benefit?

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This critical review examines published evidence regarding the impact of Percutaneous Endoscopic Gastrostomy (PEG) feeding tube insertion on survival in patients with advanced or late-stage dementia. Five studies were selected for review. Study designs include a non-randomized clinical trial, a randomized clinical trial, a retrospective between groups study, a retrospective cohort analysis, and a prospective cohort study. Overall, the evidence gathered from this review strongly suggests that PEG tube placement in patients with advanced dementia is not associated with survival benefit. Finally, study limitations and recommendations for clinical practice are discussed.

Introduction

Dementia is an incurable, progressive disorder that ultimately results in complete loss of cognitive functions and death (Meier et al., 2001). Approximately 81.1 million people worldwide will have dementia by 2040 (Sampson, Candy, & Jones, 2009). Poor food intake and malnutrition are common concerns in individuals with dementia. In advanced stages of the disease, tube feeding or enteral feeding is often used as an intervention (Sampson, Candy, & Jones, 2009). Some common indications for enteral nutrition in elderly patients include weight loss, refusal to eat, vegetative state and malignancy (Arinzon, Peisakh, & Berner, 2008). Thus, it is no surprise that health care providers often associate enteral feeding with long-term benefits for patients with dementia.

However, there is a lack of evidence for the efficacy of enteral feeding in individuals with dementia (Sampson, Candy, & Jones, 2009). In fact, tube feeding may fail to prolong life in individuals with dementia, and may even shorten these patients' lives (Garrow et al., 2007). Furthermore, the placement of the tube itself can cause complications and even death. Percutaneous Endoscopic Gastrostomy (PEG) tube placement is associated with a mortality rate of up to 2% during the operation and up to 24% perioperatively (Finucane, Christmas, & Travis, 1999).

Given the controversy surrounding enteral feeding in late-stage dementia, a clear understanding of whether the use of PEG tubes is associated with prolonged survival rate is essential in allowing health care providers to deliver the best possible care for dementia patients.

Objectives

The primary objective of this paper is to critically evaluate existing literature regarding the impact of PEG tube feeding on the survival rate of patients with advanced dementia.

Methods

Search Strategy

A variety of computerized databases, including Proquest, PubMed and Medline, were searched using the following keywords:

(enteral feeding) OR (tube feeding) OR (PEG) OR (percutaneous endoscopic gastrostomy) AND (advanced dementia) OR (late dementia) OR (severe dementia) AND (survival) OR (mortality).

The search was limited to journal articles available in English. The reference sections of related articles were also searched for other relevant studies.

Selection Criteria

Studies selected for inclusion in this critical review were required to have participants with advanced

dementia, who underwent PEG tube insertion. Studies that did not specify the participants' stage of dementia or type of enteral feeding, as well as those with participants in earlier stages of dementia or those receiving tube feeding other than PEG were excluded. Studies that included other patient populations were not excluded, if the participants with advanced dementia were separated out in the analysis.

Data Collection

The results of the literature search yielded the following five types of studies: non-randomized clinical trial (1), randomized clinical trial (1), retrospective between groups study (1), retrospective cohort analysis (1), and prospective cohort study (1).

Results

Kuo et al. (2009) conducted a non-randomized clinical trial (between groups design), where participants were not assigned to different treatment groups by chance. They investigated the incidence of PEG tube placement in nursing home residents with advanced dementia (n=97,111) over 66 years of age, and compared health care use and survival (for 1 year) in those with (n=5,209) and without a feeding tube (n=91,902). Participant-related data were collected through the analysis of Medicare Claims Files. Gold standard tools were used to identify patients with advanced dementia. Nursing home residents were followed for one year to monitor whether a feeding tube was placed. Participants who received a PEG tube were followed for one year post-feeding tube insertion to examine health care use and survival – only the latter variable is of interest in the present paper. Appropriate statistical analyses were conducted and it was revealed that PEG tube placement is associated with poor survival in patients with advanced dementia.

Strengths of this study included a large sample size, appropriate statistical analysis, as well as nation-wide sampling, which allows for better generalization of findings. A limitation was that the sample only comprised of Fee-For-Service (FFS) Medicare beneficiaries living in nursing homes. Furthermore, the non-randomized clinical trial design of the study means that there was no

full randomization. However, the lack of randomization allows for the recruitment of more eligible participants, increasing generalizability. This type of study also includes a control group, which increases internal validity (even when it is non-randomized).

Overall, this study is of high importance and provides compelling evidence that PEG tube placement is associated with low survival in patients with advanced dementia living in nursing homes.

Meier et al. (2001) assessed long-term survival, PEG tube placement, and impact of enteral feeding on survival in acutely ill, hospitalized patients with advanced dementia, who either received regular care or consultative recommendations in a randomized clinical trial (between groups design). Since the study was a randomized clinical trial (RCT), participants were assigned to the different treatment groups by chance. Outcome measures included PEG tube placement impact, survival, as well as other variables not of interest to the present review.

A total of 99 acutely ill, hospitalized patients with advanced dementia, who had an available substitute decision maker, were identified during a three-year period through daily rounds at a hospital. Appropriate tools were used to ensure that all participants had advanced dementia. Subjects were randomly assigned to either the intervention group (received consultative recommendations to increase comfort and reduce painful, non-palliative procedures) or the control group (received standard care). Appropriate statistical analysis revealed that PEG tube placement was not associated with survival, as both participant groups (with PEG tubes and without PEG tubes) had a 50% six-month median mortality rate.

Strengths of this experiment included appropriate statistical analysis, as well as the use of a blinded research assistant for data collection. Despite the RCT design, randomization was not used to place participants into PEG versus no PEG groups, and it is not known how participants were selected to receive enteral feeding. Limitations of the study included a small sample size, the use of a mostly female sample from a restricted geographical

region, and the sole recruitment of patients with available surrogate decision makers.

Overall the study provides suggestive evidence that PEG tube insertion in severely ill, hospitalized participants with advanced dementia is not associated with increased survival.

Murphy et al. (2003) conducted a two-year retrospective, between groups study on 41 patients referred for PEG tube insertion – some of whom received PEG tube feeding, while others did not. The researchers aimed to determine whether PEG tube feeding increased survival in patients with advanced dementia. Data were collected by reviewing participants' medical records. All participants had advanced dementia as per their medical files. A total of 23 participants underwent PEG tube insertion, while 18 did not, due to refusal by substitute decision makers or advance directives to not receive enteral feeding. Survival was tracked from time of PEG tube insertion to a maximum of two years. Descriptive statistics revealed no statistically significant difference between the group who underwent PEG tube placement and the group that did not, in terms of survival.

A strength of this experiment included appropriate statistical analysis and the inclusion of a control group. Limitations included an all male sample, a small sample size, retrospective design, as well as non-random assignment of groups.

Overall, taking into account the study's importance and validity, there is suggestive evidence that PEG tube insertion in patients with advanced dementia does not enhance survival, compared to no tube feeding.

Sanders et al. (2000) investigated the impact of PEG tube placement on the survival of four patient populations (N=361) needing PEG feeding, in a retrospective cohort study. The four patient groups were as follows: advanced dementia, acute stroke, oropharyngeal malignancy and miscellaneous (e.g., Parkinsonism, motor neuron disease, and cerebral palsy). Out of 361 participants, 103 had advanced dementia, as determined by gold standard tools. All 361 participants underwent PEG tube insertion. Epidemiological data and data regarding survival were gathered from medical records, surviving

patients and hospital notes. Descriptive statistics revealed a significantly worse survival rate in individuals with advanced dementia who received PEG tube feeding, compared to participants in the other groups.

Strengths of the study included an acceptable sample size, as well as appropriate statistical analysis. Limitations included the lack of a control group that did not receive tube feeding, and the retrospective design of the study. In addition, cohort studies are observational and do not include intervention, making them less rigorous than experimental designs.

Overall, considering the importance and validity of the experiment, there is suggestive evidence that PEG tube placement in individuals with advanced dementia will result in poorer survival compared to other patient populations.

Teno et al. (2012) examined survival rate after PEG tube placement, as well as the importance of the timing of feeding tube insertion in 36,492 nursing home residents in a prospective cohort study. The present paper is only interested in the impact of PEG tube placement on survival. All participants had advanced dementia as measured by gold standard tools, and were at risk of receiving enteral feeding. None of the participants joined the study with an existing feeding tube. A small portion (5.4%) of participants received a PEG tube within one to four months of developing eating problems. They were followed for a year post-PEG tube placement. Selection bias was accounted for by using appropriate statistical tools. Descriptive statistics showed that neither PEG tube insertion nor the timing of insertion significantly impacted survival.

Strengths of the study included a large sample size, prospective design, appropriate statistical analysis, as well as controlling for selection bias through appropriate statistical tools. Limitations included a mostly female sample, as well as the lack of knowledge about how participants were selected to undergo feeding tube insertion. Moreover, cohort studies are observational and do not involve intervention, making them less rigorous than experimental designs.

Overall, given the importance and validity of the experiment, there is highly suggestive evidence that PEG tube placement in nursing home residents with advanced dementia is not associated with improved survival.

Discussion

The results of the five studies examined in the present critical review provide suggestive to compelling evidence that PEG tube feeding in patients with late-stage dementia is not associated with prolonged survival. All five studies made similar conclusions, and none of them found any survival benefit to using PEG tube feeding in individuals with advanced dementia. This consistency of findings across the studies is impressive and gives more weight to the conclusions.

One interesting finding emerging from this review was that PEG tube feeding in individuals with dementia resulted in worse survival outcomes compared to other patient populations (Sanders et al., 2000). Although this evidence came from only one study, it is a finding of particular interest. One reason patients with advanced dementia may show lower benefit from PEG tube feeding could be the heterogeneity of the group, resulting in less consistent outcomes in this population. Another reason could be reduced awareness and compliance in patients with dementia, due to declined cognitive function. This could make these patients more susceptible to pulling out their feeding tube. Future research should explore the possibility of a disproportionately poor outcome for individuals with advanced dementia, as well as the variables that contribute to poor survival rate after PEG tube insertion in this population, compared to other patient groups.

Importantly, two of the studies employed a retrospective research design (Murphy et al., 2003; Sanders et al. 2000). In a retrospective study, previously collected data are analyzed, increasing potential sources of bias. Interpretations from retrospective studies are usually also limited, as researchers cannot go back and collect missing data. However, in this case, since the variable being measured is survival, a retrospective design is likely appropriate. This is because mortality

status is clearly measureable and correctly documented, regardless of whether researchers collect this information in real-time or in retrospect. Furthermore, two studies employed a cohort design (Sander et al., 2000; Teno et al., 2012), which can introduce bias, due to the observational rather than experimental nature of this type of research design.

Despite the consistency of the available evidence reviewed in the present study, a number of limitations characterized these studies. For example, patient sampling was often restricted to ill, hospitalized patients from a constrained geographic region (Meier et al., 2001), some samples had an overrepresentation of one gender (Meier et al., 2001; Murphy et al., 2003; Teno et al., 2012), some studies used a small sample size (Meier et al., 2001; Murphy et al., 2003), or in one case, the assignment of participants into groups was based on the existence of a substitute decision maker consent and/or advance directives for care (Murphy et al., 2003). All of these factors could lead to bias, which could limit the generalizability of findings.

The most ideal way to investigate whether patients with advanced dementia who undergo PEG tube placement have a better survival rate compared to those without a PEG tube, would be by conducting prospective, controlled, randomized clinical trial studies with large sample sizes. However, such studies would be ethically questionable, and not many volunteers would likely agree to being randomized to PEG or no PEG insertion groups. Therefore, a good way to explore this question would be through conducting systematic or critical reviews of current peer-reviewed journal articles, in order to evaluate the strength of evidence on the topic and to discover recurrent themes in the literature.

Clinical Implications

PEG tube feeding is the most common method of enteral nutrition for patients requiring long-term tube feeding (Sanders et al., 2000). However, its outcomes are less known for certain patient populations, such as those with advanced dementia. Despite the lack of evidence for the use of enteral feeding in patients with advanced

dementia, there are increasing requests for feeding tube insertion in this population (Sanders et al., 2000). With rising dementia rates, it is thus crucial to understand the impact of enteral feeding on patients with dementia.

The evidence in the literature suggests no survival benefit for patients with advanced dementia who undergo PEG tube placement. Healthcare professionals should therefore be hesitant to encourage PEG tube feeding in individuals with advanced dementia, at least not on the basis of survival rate.

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