Rotation 7, Week 1 PICO expanded into CAT

Clinical & PICO Question:

49-year-old female with a significant past medical history of medically treated cholecystitis presents complaining of epigastric pain x 2 days. The pain radiates to her back and is worse when she lies down or eats; nothing alleviates the pain. Abdominal ultrasound was performed with findings consistent with Ranson 0 acute pancreatitis. Patient was made NPO and given IV fluids and monitored for symptom resolution.

**In adult patients with acute pancreatitis, does early feeding result in better patient outcome than delayed feeding?**

PICO Search Elements:

|  |  |  |  |
| --- | --- | --- | --- |
| **P** | **I** | **C** | **O** |
| Acute pancreatitis | Early feeding | Delayed feeding | Patient outcome |
| Adults with acute pancreatitis | Enteral nutrition | NPO | Prognosis |
|  | NG tube feeding | Bowel rest | Symptom resolution |
|  | NJ tube feeding |  | Recurrence |
|  |  |  |  |
|  |  |  |  |

Search Strategy:

**Google Scholar**

* Bowel rest vs early feeding for acute pancreatitis
	+ 🡪26,300 results
	+ Filters: Published since 2015, sort by relevance, exclude patents and citations
		- 🡪17,300 results

**PubMed**

* Early versus delayed feeding in acute pancreatitis
	+ 🡪 8 results
	+ Filters: Published since 2015, humans
		- 🡪 4 results
* Early feeding for acute pancreatitis
	+ 🡪 234 results
	+ Filters: Published since 2015, humans
		- 🡪38 results

**Cochrane Library**

* Early feeding acute pancreatitis
	+ 🡪95 results
	+ Filters: Published since 2015
		- 🡪 35 results

**Trip Database**

* P - Adults with pancreatitis
* I – Early feeding
* C – Delayed feeding
* O – Prognosis
	+ 🡪 268 results

In choosing my final articles for inclusion, I considered first the level of evidence. Of course there was preference for systematic reviews and meta analyses, but when those became unavailable, I found randomized control trials and cohort studies to be appropriate levels of evidence because of the nature of my question. These types of studies would allow for the direct comparison of early versus delayed feeding in patients with acute pancreatitis. Next I looked at how recently the articles were published. I preferred articles published within the last 5 years because that implies that they have considered the most up to date evidence, but in expanding my search for this CAT, I considered articles published within the last 10 years. Finally, I searched for articles with larger sample sizes because more data points lend more power to the results.

After the feedback from my CAT draft, I included an additional article that was published in the United States, despite the level of evidence not being as high as some of the other articles and it being slightly more outdated.

Articles Chosen (5-8) for Inclusion (please copy and paste the abstract with link):

**Early Versus Delayed Feeding in Patients with Acute Pancreatitis: A Systematic Review**

Vaughn, V. M., Shuster, D., Rogers, M. A. M., Man, J., Conte, M. L., Saint, S., & Chopra, V. (2017). Early versus delayed feeding in patients with acute pancreatitis: A systematic review. *Annals of Internal Medicine; 166(12)*, 883-892.

<https://www.acpjournals.org/doi/abs/10.7326/M16-2533?casa_token=jnMCYXwDw2UAAAAA%3AjsWbrLY6jDf1Isq_Jf-jz5WhWu39UGAXjYy4aU8pqUSa1OpA-q6nAKsfK8GwJUuVT1BXeKULTroPm7lY&journalCode=aim>

**Background:**

Acute pancreatitis is among the most common and costly reasons for hospitalization in the United States. Bowel rest, pain control, and intravenous fluids are the cornerstones of treatment, but early feeding might also be beneficial.

**Purpose:**

To compare length of hospital stay, mortality, and readmission in adults hospitalized with pancreatitis who received early versus delayed feeding.

**Data Sources:**

MEDLINE via Ovid, EMBASE, the Cochrane Library, CINAHL, and Web of Science through January 2017.

**Study Selection:**

Two authors independently reviewed and selected studies if they were randomized clinical trials, included adults hospitalized with acute pancreatitis, and compared early versus delayed feeding (≤48 vs. >48 hours after hospitalization).

**Data Extraction:**

Two investigators independently extracted study data and rated risk of bias using the Cochrane Collaboration tool.

**Data Synthesis:**

Eleven randomized trials (8 peer-reviewed publications, 3 abstract-only presentations) that included 948 patients were eligible. Seven trials (3 with low risk of bias) enrolled patients with mild to moderate pancreatitis. Four trials (1 with low risk of bias) included patients with predicted severe pancreatitis. Routes used for early feeding included oral (4 studies), nasogastric (2 studies), nasojejunal (4 studies), and oral or nasoenteric (1 study). Among patients with mild to moderate pancreatitis, early feeding was associated with reduced length of stay in 4 of 7 studies (including 2 of 3 with low risk of bias). Other outcomes were heterogeneous and variably reported, but no study showed an increase in adverse events with early feeding. Among patients with severe pancreatitis, limited evidence revealed no statistically significant difference in outcomes between early and delayed feeding.

**Limitation:**

Heterogeneity of feeding protocols and outcomes, scant data, and unclear or high risk of bias in several studies.

**Conclusion:**

Limited data suggest that early feeding in patients with acute pancreatitis does not seem to increase adverse events and, for patients with mild to moderate pancreatitis, may reduce length of hospital stay.

**When to Initialize Enteral Nutrition in Patients with Severe Acute Pancreatitis?**

Wu, X. M., Liao, Y. W., Wang, H. Y., Ji, K. Q., Li, G. F., & Zang., B. (2015). When to initialize enteral nutrition in patients with severe acute pancreatitis? *Pancreas; 44 (3)*, 507-511.

<https://journals.lww.com/pancreasjournal/Abstract/2015/04000/When_to_Initialize_Enteral_Nutrition_in_Patients.23.aspx>

**Objective**

The present retrospective study aimed to analyze the optimal time to initiate enteral nutrition (EN) in patients with severe acute pancreatitis at a single Chinese institution (China Medical University Hospital).

**Methods**

A total of 1196 patients with severe acute pancreatitis were admitted in the intensive care unit between November 2003 and June 2013; 1092 patients were selected and were divided into the early and delayed EN groups, according to their initial timing of EN.

**Results**

Five hundred sixty-six patients were administered with the delayed EN, and 526 with the early EN. Both groups had similar severity of pancreatic necrosis, but organ failure developed in 81% patients of the delayed EN group and 21% in the early EN group (*P* < 0.01). The numbers of septic necrosis and morbidity were significantly higher in the delayed EN group than in the early EN (*P* < 0.01).

**Conclusions**

The early EN had significant benefits over the delayed EN in the decrease of organ failure and mortality; our findings suggested that the first 48 hours of administration in the intensive care unit was the optimal time to start EN.

**Meta-Analysis of Early Nutrition: The Benefits of Enteral Feeding Compared to a Nil Per Os Diet Not Only in Severe, but Also in Mild and Moderate Acute Pancreatitis**

Márta, K., Farkas, N., Szabó, I., Illés, A., Vincze, A., Pár, G., Sarlós, P., Bajor, J., Szücs, A., Czimmer, J., Mosztbacher, D., Párniczky, A., Szemes, K., Pécsi, D., & Hegyu, P. (2016). Meta-analysis of early nutrition: The benefits of enteral feeding compared to a nil per os diet not only in severe, but also in mild and moderate acute pancreatitis. *International Journal of Molecular Science; 17 (10)*, 1-12.

<https://pubmed.ncbi.nlm.nih.gov/27775609/>

The recently published guidelines for acute pancreatitis (AP) suggest that enteral nutrition (EN) should be the primary therapy in patients suffering from severe acute pancreatitis (SAP); however, none of the guidelines have recommendations on mild and moderate AP (MAP). A meta-analysis was performed using the preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P). The following PICO (problem, intervention, comparison, outcome) was applied: P: nutrition in AP; I: enteral nutrition (EN); C: nil per os diet (NPO); and O: outcome. There were 717 articles found in Embase, 831 in PubMed, and 10 in the Cochrane database. Altogether, seven SAP and six MAP articles were suitable for analyses. In SAP, forest plots were used to illustrate three primary endpoints (mortality, multiorgan failure, and intervention). In MAP, 14 additional secondary endpoints were analyzed (such as CRP (C-reactive protein), WCC (white cell count), complications, etc.). After pooling the data, the Mann-Whitney *U* test was used to detect significant differences. Funnel plots were created for testing heterogeneity. All of the primary endpoints investigated showed that EN is beneficial vs. NPO in SAP. In MAP, all of the six articles found merit in EN. Analyses of the primary endpoints did not show significant differences between the groups; however, analyzing the 17 endpoints together showed a significant difference in favor of EN vs. NPO. EN is beneficial compared to a nil per os diet not only in severe, but also in mild and moderate AP.

**Early Versus On-Demand Nasoenteric Tube Feeding in Acute Pancreatitis**

Bakker, O. J., van Brunschot, S., van Santvoort, H. C., Besselink, M. G., Bollen, T. L., Boermeester, M. A., Dejong, C. H., van Goor, H., Bosscha, K., Ali, U. A., Bouwense, S., van Grevenstein, W. M., Heisterkamp, J., Houdijk, A. P., Jansen, J. M., Karsten, T. M., Manusama, E. R., Nieuwenhujis, V. B., Schaapherder, A. F., van der Schelling, G. P., Schwartz, M. P., Spanier, B. W. M., Tan, A., Vecht, J., Weusten, B. L., Witteman, B. J., Akkermans, L. M., Bruno, M. J., Dijkgraff, M. G., van Ramshorst, B., Gooszen, H. G., & Dutch Pancreatitis Study Group. (2014). Early versus on-demand nasoenteric tube feeding in acute pancreatitis. *New England Journal of Medicine; 371 (21),* 1983-1993.

<https://pubmed.ncbi.nlm.nih.gov/25409371/>

**Background:**

Early enteral feeding through a nasoenteric feeding tube is often used in patients with severe acute pancreatitis to prevent gut-derived infections, but evidence to support this strategy is limited. We conducted a multicenter, randomized trial comparing early nasoenteric tube feeding with an oral diet at 72 hours after presentation to the emergency department in patients with acute pancreatitis.

**Methods:**

We enrolled patients with acute pancreatitis who were at high risk for complications on the basis of an Acute Physiology and Chronic Health Evaluation II score of 8 or higher (on a scale of 0 to 71, with higher scores indicating more severe disease), an Imrie or modified Glasgow score of 3 or higher (on a scale of 0 to 8, with higher scores indicating more severe disease), or a serum C-reactive protein level of more than 150 mg per liter. Patients were randomly assigned to nasoenteric tube feeding within 24 hours after randomization (early group) or to an oral diet initiated 72 hours after presentation (on-demand group), with tube feeding provided if the oral diet was not tolerated. The primary end point was a composite of major infection (infected pancreatic necrosis, bacteremia, or pneumonia) or death during 6 months of follow-up.

**Results:**

A total of 208 patients were enrolled at 19 Dutch hospitals. The primary end point occurred in 30 of 101 patients (30%) in the early group and in 28 of 104 (27%) in the on-demand group (risk ratio, 1.07; 95% confidence interval, 0.79 to 1.44; P=0.76). There were no significant differences between the early group and the on-demand group in the rate of major infection (25% and 26%, respectively; P=0.87) or death (11% and 7%, respectively; P=0.33). In the on-demand group, 72 patients (69%) tolerated an oral diet and did not require tube feeding.

**Conclusions:**

This trial did not show the superiority of early nasoenteric tube feeding, as compared with an oral diet after 72 hours, in reducing the rate of infection or death in patients with acute pancreatitis at high risk for complications. (Funded by the Netherlands Organization for Health Research and Development and others; PYTHON Current Controlled Trials number, ISRCTN18170985.).

**Early Nasogastric Tube Feeding Versus Nil Per Os In Mild to Moderate Acute Pancreatitis: A Randomized Controlled Trial**

Petrov, M., McIlroy, K., Grayson, L., Phillips, A. R. J., & Windsor, J. A. (2013). Early nasogastric tube feeding versus nil per os in mild to moderate acute pancreatitis: A randomized controlled trial. *Clinical Nutrition; 32 (5),* 697-703.

<https://pubmed.ncbi.nlm.nih.gov/23340042/>

**Background & aims:**

Nasojejunal tube feeding is a standard of care in patients with predicted severe acute pancreatitis (AP) and several recent trials suggested that nasogastric tube feeding (NGT) is as safe and efficient as nasojejunal tube feeding in these patients. The aim was to investigate whether NGT presents any benefit to patients with mild to moderate AP.

**Methods:**

The study design was a randomized controlled trial. The patients in the intervention group received NGT within 24 h of hospital admission. The patients in the control group were on nil per os (NPO). The severity of acute pancreatitis was determined according to the new international multidisciplinary classification.

**Results:**

There were 17 patients randomly allocated to the NGT group and 18 to the NPO group. The visual analogue pain score decreased to a significantly greater extent in the NGT group (from median 9 (range 7-9) at baseline to 1 (0-3) at 72 h after randomization) compared with the NPO group (from 7 (5-9) to 3 (1-4) (p = 0.036). The number of patients not requiring opiates at 48 h after randomization was significantly different (p = 0.024) between NGT (9/17) and NPO (3/18). Oral food intolerance was observed in 1/17 patient in the NGT group and 9/18 patients in the NPO group (p = 0.004). The overall hospital stay in the NGT group was 9 (5-12) days as compared with 8.5 (6-13) days in the NPO group (p = 0.91).

**Conclusions:**

NGT commenced within 24 h of hospital admission is well tolerated in patients with mild to moderate acute pancreatitis. Further, when compared with NPO, it significantly reduces the intensity and duration of abdominal pain, need for opiates, and risk of oral food intolerance, but not overall hospital stay.

**Nutritional Support in Acute Pancreatitis: A Systematic Review of the Literature**

McClave, S. A., Chang, W. K., Dhaliwal, R., & Heyland, D. K. (2006). Nutritional support in acute panceratitis: A systematic review of the literature. *Journal of Parenteral and Enteral Nutrition; 30 (2),* 143-156.

<https://onlinelibrary.wiley.com/doi/full/10.1177/0148607106030002143?casa_token=JBZdZ2MYCcsAAAAA%3A7eNwvDl7Rx9Apqa_ke-XgqStVqWbiE66fQzIBzf50w3GDMaZwuJJDZAlLaCsS1Y0UrBPtycz1Hov-rg>

*Background:*

Failure to use the gastrointestinal (GI) tract in patients with acute pancreatitis may exacerbate the stress response and disease severity, leading to greater incidence of complications and prolonged hospitalization. The objectives of this study were to determine the optimum route for nutrition support, whether nutrition therapy is better than no artificial nutrition support, whether specific additives to enteral or parenteral therapy can further enhance their efficacy, and whether methodologic differences in delivery of enteral nutrition (EN) influence tolerance.

*Methods:*

A computerized search was performed of MEDLINE, Cochrane database, EMBASE, and reference lists of pertinent review articles for prospective randomized trials in adult patients with acute pancreatitis that evaluated interventions with nutrition therapy. Primary outcome data and surrogate endpoint parameters (for nutrition indices, stress markers, and measures of the inflammatory/immune response) were extracted in duplicate independently. Where appropriate, meta‐analysis was performed by random‐effects model.

*Results:*

From 119 articles screened, 27 randomized controlled trials were included and analyzed. In patients admitted for acute pancreatitis, meta‐analysis of 7 trials showed that use of EN was associated with a significant reduction in infectious morbidity (risk ratio [RR] = 0.46; 95% confidence interval [CI], 0.29 – 0.74; *p* = .001) and hospital length of stay (LOS; weighted mean difference [WMD] =– 3.94; 95% CI, –5.86 to –2.02; *p* < .0001), a trend toward reduced organ failure (RR = 0.59; 95% CI, 0.28–1.27; *p* = .18), with no effect on mortality (RR = 0.88; 95% CI, 0.43–1.79; *p* = .72) when compared with use of parenteral nutrition (PN). Results from individual studies suggest that EN in comparison to PN reduces oxidative stress, hastens resolution of the disease process, and costs less. Insufficient data exist to determine whether EN improves outcome over standard therapy (no artificial nutrition support) in patients admitted for acute pancreatitis. However, in those patients requiring surgery for complications of acute pancreatitis, meta‐analysis of 2 trials indicates that provision of EN postoperatively may reduce mortality (RR = 0.26; 95% CI, 0.06– 1.09; *p* = .06) compared with standard therapy. PN provided early within 24 hours of admission was shown to worsen outcome, whereas PN provided later after full‐volume resuscitation appeared to improve outcome when compared with standard therapy. In early individual studies, specific supplements added to EN, such as arginine, glutamine, ω‐3 polyunsaturated fatty acids, and probiotics, may be associated with a positive impact on patient outcome in acute pancreatitis, compared with EN alone without the supplements, but studies are too few to make strong treatment recommendations. Supplementation of PN with parenteral glutamine was shown to reduce oxidative stress and improve patient outcome (reduced duration of nutrition therapy and decreased hospital LOS) compared with PN alone in patients with acute pancreatis. A wide range of tolerance to EN exists, irrespective of known influences such as mode (continuous *vs* bolus) and level of infusion within the GI tract (gastric *vs* postpyloric).

*Conclusions:*

Patients with acute severe pancreatitis should begin EN early because such therapy modulates the stress response, promotes more rapid resolution of the disease process, and results in better outcome. In this sense, EN is the preferred route and has eclipsed PN as the new “gold standard” of nutrition therapy. When PN is used, it should be initiated after 5 days. The favorable effect of both EN and PN on patient outcome may be further enhanced by supplementation with modulators of inflammation and systemic immunity. Individual variability allows for a wide range of tolerance to EN, even in severe pancreatitis.

**Summary of the Evidence**:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Author (Date) | Level of Evidence | Sample/Setting(# of subjects/ studies, cohort definition etc. ) | Outcome(s) studied | Key Findings | Limitations and Biases |
| Vaughn, V. M., Shuster, D., Rogers, M. A. M., Man, J., Conte, M. L., Saint, S., & Chopra, V.2017 | Systematic Review | * 11 RCTs, n= 948
* Compared early (< 48 hours) versus delayed (>48 hours) feeding in acute pancreatitis
 | * Primarily compared length of hospital stay, mortality, and readmission in adults hospitalized with acute pancreatitis in early versus delayed feeding groups
* Secondarily analyzed feeding intolerance, nausea, vomiting, recurrent abdominal pain, and progression to necrotizing pancreatitis
 | * Early feeding appears to result in a reduced length of hospital stay in mild to moderate pancreatitis.
* Of the two articles that reported length of hospital stay in severe pancreatitis, one showed decreased length of stay with early feeding, while the other showed a slightly increased mean length of stay.
* No deaths were reported in any of the studies comparing early and delayed feeding in cases with mild to moderate pancreatitis, but of the 2 articles that reported mortality rates in severe pancreatitis cases, one showed higher mortality in early feeding and the other showed lower mortality in early feeding.
* Readmission rates were not significantly different between the early and delayed feeding groups.
* In the secondary outcomes measured, early feeding was associated with lower feeding intolerance, decreased reported nausea, no difference in recurrent abdominal pain, and no difference in progression to necrotizing pancreatitis.
* Overall, this study provided more information concerning mild to moderate pancreatitis than severe pancreatitis due to the availability of data.
 | * One limitation of this study is that the method of early feeding was not standardized and varied from oral feeding, where the diet was not the same across all patients, NG tube feeding, and NJ tube feeding.
* Additionally, not all the studies in the article examined all the search outcomes set forth by the researchers. This made it difficult to assess for an overall outcome.
* Moreover, the studies included were all from different countries, which means there is questionable generalizability to the local population.
 |
| Wu, X. M., Liao, Y. W., Wang, H. Y., Ji, K. Q., Li, G. F., & Zang., B.2015 | Retrospective Cohort Study | * N = 1092
	+ 526 in early feeding group
	+ 566 in delayed feeding group (>48 hours)
* Above the age of 18 with severe pancreatitis admitted to ICU
 | * Sought to determine when the optimal time to initiate feeding via NJ tube in ICU patients with severe acute pancreatitis
* Rate of and time to surgical intervention
* Surgical complication and reoperation
* Septic necrosis
* Organ failure and death
 | * Significantly decreased rate of surgical intervention in the early feeding group compared to the delayed group (p<.001) and that the time to surgical intervention was longer in the early feeding group compared to the delayed feeding group.
* Significantly more patients in the delayed group also had intraoperative hemorrhages and greater rates of reoperation.
* There was also a significantly increased rate of septic necrosis in the delayed group versus the early group (p<.01).
* Additionally, they found that morbidity rates were significantly higher in the delayed group than the early group (p<.05) and significantly more patients in the delayed group experienced organ failure (p<.01) and death (p<.05)
 | * The researchers only included patients with severe pancreatitis in the ICU setting, which is not the typical patient with pancreatitis.
* Additionally, the study was conducted in China, which means that the result, however strong, is not completely generalizable to the local population
 |
| Márta, K., Farkas, N., Szabó, I., Illés, A., Vincze, A., Pár, G., Sarlós, P., Bajor, J., Szücs, A., Czimmer, J., Mosztbacher, D., Párniczky, A., Szemes, K., Pécsi, D., & Hegyu, P2016 | Systematic Review and Meta-analysis | * 7 articles inlcuded
 | * Primary endpoints of the study include mortality, multiorgan failure, and intervention.
* Secondarily, CRP, WBCs, and complications were assessed between receiving early nutrition and NPO status
 | * It appears that there was no significant difference in the incidence of multi-organ failure among patients who received early enteral nutrition versus those who were kept NPO.
* They found that early feeding cut down on length of hospital stay without adverse effects.
* Additionally, feeding was well tolerated and decreased the intensity and duration of abdominal pain, lessening the need for opiate analgesia.
* Early feeding also minimized oral food intolerance compared to NPO treatment
 | * Only 7 studies were included in the meta-analysis.
* Additionally, the methods in these 7 studies were not standardized, which can contribute to heterogeneity within them.
* Finally, this study was conducted in Hungary, so the results may not be generalizable for the local population
 |
| Bakker, O. J., van Brunschot, S., van Santvoort, H. C., Besselink, M. G., Bollen, T. L., Boermeester, M. A., Dejong, C. H., van Goor, H., Bosscha, K., Ali, U. A., Bouwense, S., van Grevenstein, W. M., Heisterkamp, J., Houdijk, A. P., Jansen, J. M., Karsten, T. M., Manusama, E. R., Nieuwenhujis, V. B., Schaapherder, A. F., van der Schelling, G. P., Schwartz, M. P., Spanier, B. W. M., Tan, A., Vecht, J., Weusten, B. L., Witteman, B. J., Akkermans, L. M., Bruno, M. J., Dijkgraff, M. G., van Ramshorst, B., Gooszen, H. G., & Dutch Pancreatitis Study Group2014 | Randomized Control Trial | * N = 208
	+ 101 in early feeding group
	+ 104 in late/on demand feeding group
* Adults with first episode of pancreatitis at high risk for complications (APACHE II score of 8 or more)
 | * Primary endpoints included incidence of major infection and death within 6 months of enrollment to the trial
* Secondary endpoints included development of necrotizing pancreatitis and multi-organ failure
 | * There was no significant difference in any of the outcomes measured between the two groups
* However, there was a significantly shorter time to complete tolerance of oral diet in the delayed group versus the early group
 | * The sample studied is very small, limiting the power of the result
* This is a Dutch study, making the generalizability to the local population questionable
 |
| Petrov, M., McIlroy, K., Grayson, L., Phillips, A. R. J., & Windsor, J. A2013 | Randomized control trial | * N = 35
	+ 17 in early NGT group
	+ 18 in NPO group
* Adult patients with mild to moderate acute pancreatitis
 | * Primary outcome measured was length of hospital stay
* Secondary outcomes included:
	+ Pain score and duration of pain
	+ Need for opiates
	+ Oral food tolerance and time to tolerance
	+ Progression of severity
	+ Complications and in-hospital mortality
	+ Hospital readmission
 | * There was no significant difference in length of hospital stay between the two groups
* There was significantly greater rate of food intolerance among the NPO group compared to the early NGT group (p = .004) and a greater rate of GI side effects in the NPO group
* Significantly lower pain scores at 72 hours after admission in the NGT group (p = .036) and significantly less opioid use for pain management (p = .023)
* There was significantly less time to “no pain” status in the NGT group (p = .023)
* There was no significant difference in rate of intervention between the two groups.
* There was no significant difference in severity progression, in-hospital mortality, and hospital readmission
 | * The very small number of participants lends less power to the results
* Blinding was not possible, potentially leading to observational bias
* Only mild-moderate acute pancreatitis was investigated
* Since this is a foreign study, the results might not be generalizable to the local population
 |
| McClave, S. A., Chang, W. K., Dhaliwal, R., & Heyland, D. K2006 | Systematic Review and Meta-Analysis | * 27 randomized controlled trials
 | * Optimum route for nutritional support
* Compare outcome in nutritional support versus NPO
* Impact of additives to enteral or parenteral therapy on efficacy
 | * Significant reduction of infectious morbidity with early enteral nutrition (p =.001)
* Significantly decreased length of hospital stay with enteral nutrition (p <.001)
* Trend toward significance for reduced organ failure (p = .18)
* Enteral nutrition reduces oxidative stress, decreases time to symptom resolution, and results in lower hospital costs compared to parenteral nutrition
* Insufficient evidence to compare early enteral nutrition to traditional NPO status
* Early parenteral nutrition may result in worse outcomes for patients
 | * This article was published in 2006, so it is on the older side, but I chose to include it due to its publication in the United States
* The studies included are from a wide variety of countries and only include a small number of patients in each
* Does not completely align with the outcomes I was searching for
 |

Conclusion(s):

- Briefly summarize the conclusions of each article, then provide an overarching conclusion.

* Vaughn, et al. – Early feeding in patients with mild to moderate acute pancreatitis is well tolerated and appears to reduce the length of hospital stay and results in lower rates of feeding intolerance than delayed feeding
* Wu, et al. – There were significantly decreased rates of surgical intervention and increased time to intervention in the early feeding group, as well as lower rates of postsurgical complications and morbidity
* Márta, et al. – Length of hospital stay, pain, need for opiate analgesia, and rate of feeding intolerance were significantly decreased with early feeding.
* Bakker, et al. – There was no significant difference in any of the measured outcomes between early and delayed feeding.
* Petrov, et al. – Early feeding resulted in significantly greater food tolerance, decreased pain at 72 hours, decreased need for opioid analgesia, and faster complete resolution of pain than NPO status.
* McClave, et al. – Early enteral feeding is associated with significantly decreased infectious morbidity, length of hospital stay, oxidative stress, and lower healthcare costs. There is also a trend towards significance in organ failure compared to delayed parenteral nutrition. The studies included, however, did not provide enough information to effectively and reliably compare early enteral nutrition to traditional NPO status.

Though the high-quality, reliable research available at present is somewhat limited, the articles cited above suggest that early feeding, while not significantly different in the impact on mortality, can significantly decrease length of hospital stay, limit the necessity for opioid analgesia, minimize adverse effects, and slow or decrease progression to infectious necrotizing pancreatitis. All of this might be indicative that early feeding can be a means of lowering healthcare costs, improving patient outcome, and improving patient experience during treatment. While it may be difficult to definitively say that there is a benefit to early enteral feeding in acute pancreatitis, all the research agrees that there appears to be no harm, as was previously believed.

Clinical Bottom Line:

* Weight of the evidence
	+ I weighed the Vaughn article the most in my clinical bottom line because it represents the highest possible level of evidence, was the most recently published so that it factored in the most current and relevant information, and had nearly 1,000 data points. This article also factored in both mild to moderate and severe acute pancreatitis and many secondary points that added to the conclusions of this CAT. Next, I weighed the Wu article because, although it is only a retrospective cohort study and not the highest level of evidence, it had the greatest number of participants and was published within the last 5 years. It also considered all the outcomes I was looking for to answer my question. Third, I considered the outcomes presented in the Márta article because, while it was a meta-analysis, the number of articles it considered were pretty limited with only 7 articles. Next, I considered the Bakker and Petrov articles because, although they examined all the outcomes I was interested in, they are older and have the least participants, limiting their power. Finally, I weighed the McClave article because it was the oldest article and did not address the exact outcomes I was interested in. However, it was published in the United States and provided the alternative perspective of early enteral nutrition versus early and delayed parenteral nutrition, which is an interesting consideration in addition to traditional NPO status.
* Magnitude of any effects
	+ Early feeding resulted in improved feeding tolerance, lower length of hospital stay, decreased and delayed progression to severe disease, and decreased need for opioid analgesia compared to delayed feeding in acute pancreatitis.
* Clinical Significance
	+ The articles cited above suggest that early feeding, while not significantly different in the impact on mortality, can decrease length of hospital stay, minimize adverse effects, and slow or decrease progression to infectious necrotizing pancreatitis. All of this might be indicative that early feeding can be a means of lowering healthcare costs, improving patient outcome, and improving patient experience during treatment. Additionally, with overall improved pain scores and decreased need for opioid analgesia, early feeding may decrease potential complications and opioid dependence, particularly in vulnerable populations
* Any other considerations
	+ The mainstay of treatment for acute pancreatitis has long been bowel rest via NPO status and fluid resuscitation. However, recent research has brought this into question, particularly in severe acute pancreatitis as defined by scoring criteria like the Ranson Criteria or APACHE II score. Being that this has been the common understanding for a multitude of years, research has only really been conducted in recent years to compare early enteral nutrition via oral feeding, NG tubes, and NJ tubes within the first 48 hours of diagnosis to delayed feeding after 48 hours or until symptom resolution.
	+ As previously mentioned, there is not a large wealth of data available on feeding in acute pancreatitis, especially in mild and moderate cases, which represent the majority. Additionally, of the research that is available, it appears that a large portion of it was not conducted within the United States. In order to paint the clearest impact on early feeding as a treatment standard in acute pancreatitis for the local population, further research must be conducted within the United States with larger sample sizes.