6-2021

# Pancrelipase use with eating disorders: Summary

Children's Mercy Kansas City

# *Office of Evidence Based Practice (EBP) – Critically Appraised Topic (CAT): Pancrelipase use with Eating Disorders*

**Specific Care Question**
In patients with eating disorders, are there indications of pancreatitis?

In patients with eating disorders, does pancrelipase improve outcomes?

**Recommendations Based on Current Literature (Best Evidence) Only**
*Based off a limited number of case reports, pancreatitis may be associated with eating disorders*

*No recommendation can be made for or against the use of pancrelipase in patients with eating disorders, based on expert review of current literature by the Department of EBP. When there is a lack of scientific evidence, standard work should be developed, implemented, and monitored.*

**Literature Summary**

**Background.** Patients with eating disorders such as anorexia nervosa or bulimia nervosa exhibit preoccupations with food, weight, and body image (Guarda, 2021a). Per the American Psychiatric Association (Guarda, 2021b), some behaviors associated with these types of eating disorders include restrictive eating, purging food by vomiting, binging on food, overuse of laxatives, and excessive exercise. As a result of these behaviors, individuals with eating disorders can negatively affect their overall health, as evidenced by the deterioration of organ function, dental and bone health, and/or psychologic function (Anderson et al., 1997). In addition, these patients are sometimes hospitalized for acute abdominal pain because of these behaviors.

Hospitalists and pharmacists assume care of admitted patients with eating disorders when there is no established eating disorders unit. A plan of care for these patients has two goals: reducing abdominal pain and improving nutritional support. In addition, diagnostic testing should be considered to establish if the cause of pain is due to organ failure and, more specifically, pancreatic dysfunction (Lowe, 2021).

Pancreatic dysfunction and pancreatitis in children are rare as it only occurs in approximately 10,000 children in the United States each year with 30% of cases progressing to chronic pancreatitis (Saeed, 2020). This dysfunction can cause gas, bloating, abdominal pain, diarrhea, and weight loss (Saeed, 2020). As the behaviors of patients with eating disorders can cause similar symptoms as pancreatitis and potentially result in a diagnosis of pancreatitis, it is important for care providers to be aware of these similarities and complete appropriate testing Anderson et al., 1997; Saeed, 2020).

Pancreatic enzyme replacement therapy (PERT) is increasingly considered for treating pancreatitis in children with pancreatic exocrine dysfunction secondary to malnutrition, cystic fibrosis, diabetes, pancreatic cancer, and other life-limiting or terminal diseases (Brennan & Saif, 2019; Guven et al., 2020; Ianiro et al., 2016; Layer et al., 2019; Noble et al., 2021; Perbtani & Forsmark, 2019; Sankararaman et al., 2019; Suzuki et al., 2020; Tuluce et al., 2020). PERT provides augmentative pancreatic enzymes, including pancrelipase, to reduce symptoms such as pain and diarrhea while improving the absorption of required nutrients (Layer et al., 2019).
The purpose of this review is to answer whether patients with eating disorders can have a secondary diagnosis of pancreatitis and if pancrelipase is used to treat patients with these patients.

**Study characteristics**. The search for suitable studies was completed on April 12, 2021. J. Julian, MD, MPHTM and D. Younggren, PharmD reviewed the 48 titles and/or abstracts found in the search and identified[a] 23 single studies believed to answer the posed questions. After an in-depth review of the 23 articles[b], eight answered the first question of evidence of pancreatitis in patients with eating disorders (Backett, S. 1985; Birmingham & Boone 2004; Cox et al., 1983; Kim, 2011; Marano & Sangree, 1984; Morris et. al., 2004; Urso et al., 2013; Wesson et al., 2008).

***First question: In patients with eating disorders, are there indications of pancreatitis?*** One case series (Cox et al., 1983), and seven case studies (Backett, 1985; Birmingham & Boone, 2004; Kim et al., 2011; Marano & Sangree, 1984; Morris et al., 2004; Urso et al., 2013; Wesson et al., 2008), answered the question of indications of pancreatitis in patients with eating disorders (see Figure 1).

***Second question:*** ***In patients with eating disorders, does pancrelipase improve outcomes?*** There is currently no literature that reports the use of PERT, or specifically, pancrelipase supplementation, to treat pancreatitis in patients with a primary diagnosis of an eating disorder.

**Summary by Outcome**

**Pancreatitis in Eating Disorders** (see Table 1). One case series (Cox et al., 1983), and seven case studies (Backett, 1985; Birmingham & Boone, 2004; Kim et al., 2011; Marano & Sangree, 1984; Morris et al., 2004; Urso et al., 2013; Wesson et al., 2008), describes and identifies pancreatitis diagnosis secondary to eating disorders, *N* = 14. All fourteen patients had a primary diagnosis of an eating disorder, either anorexia nervosa or bulimia nervosa. Thirteen patients had their amylase levels analysed as part of diagnostics to confirm a diagnosis of pancreatitis (Backett, 1985; Birmingham & Boone, 2004; Cox et al., 1983; Kim et al., 2011; Marano & Sangree, 1984; Morris et al., 2004; Urso et al., 2013). All fourteen patients completed radiologic diagnostics: one study used x-ray only (Backett, 1985), Five studies/11 cases, used ultrasound (Cox et al., 1983; Marano & Sangree, 1984; Morris et al., 2004; Urso et al., 2013; Wesson et al., 2008), three cases used computed tomography (CT) scans, (Kim et al., 2011; Morris et al., 2004; Wesson et al., 2008) and one study used magnetic resonance imaging in addition to ultrasound and CT scan (Wesson et al., 2008).

**Identification of Studies**

**Search Strategy and Results** (see Figure 1)

("Feeding and Eating Disorders" [Mesh] OR "Feeding and Eating Disorders of Childhood" [Mesh] OR "Malnutrition" [Mesh] OR malnourish* OR "eating disorder*") AND ("pancreatic insufficiency" OR pancreatitis OR Pancrelipase OR "pancreatic enzyme replacement therapy")

Records identified through database searching *n* = 48

Additional records identified through other sources *n* = 0

*Studies Included in this Review*

| Citation | Study Type |
|---|---|
| Backett, S. (1985) | Case Study |
| Birmingham & Boone (2004) | Case Study |
| Cox et al. (1983) | Case Series |
| Kim et al., (2011) | Case Study |
| Marano & Sangree (1984) | Case Study |
| Morris et al., (2004) | Case Study |
| Urso et al., (2013) | Case Study |
| Wesson et al., (2008) | Case Study |

*Studies Not Included in this Review with Exclusion Rationale*

| Citation | Reason for exclusion |
|---|---|
| Anderson et al., (1997) | Narrative review |
| Baranowska & Kochanowski (2018) | Narrative review |
| Brennan & Saif (2019) | Wrong population |
| Freeman et al., (2021) | Position paper |
| Guven et al., (2020) | Wrong population |

| | |
|---|---|
| Humphries et al., (1987) | Wrong intervention |
| Ianiro et al., (2016) | Wrong population |
| Kahl et al., (2014) | Wrong population |
| Layer et al., (2019) | Wrong population |
| Noble et al., (2021) | Wrong population/wrong age group |
| Perbtani & Forsmark (2019) | Narrative review |
| Riedlinger et al., (2020) | Wrong population |
| Sankararaman et al., (2019) | Wrong population |
| Suzuki et al., (2021) | Wrong population |
| Tuluce et al., (2020) | Wrong population |

**Methods Used for Appraisal and Synthesis**

[a]Rayyan is a web-based software used for the initial screening of titles and / or abstracts for this analysis (Ouzzani, Hammady, Fedorowicz & Elmagarmid, 2017).

[b]The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram depicts the process in which literature is searched, screened, and eligibility criteria is applied (Moher, Liberati, Tetzlaff, & Altman, 2009).

[a]Ouzzani, M., Hammady, H., Fedorowicz, Z., & Elmagarmid, A. (2016). Rayyan-a web and mobile app for systematic reviews. Systematic Reviews, 5(1), 210. doi:10.1186/s13643-016-0384-4

[b]Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). *P*referred *R*eporting *I*tems for *S*ystematic Reviews and *M*eta-*A*nalyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097. **For more information, visit www.prisma-statement.org.**

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*Acronyms Used in this Document*

| Acronym | Explanation |
|---|---|
| AGREE II | Appraisal of Guidelines Research and Evaluation II |
| CAT | Critically Appraised Topic |
| EBP | Evidence Based Practice |
| PERT | Pancreatic Enzyme Replacement Therapy |
| PRISMA | Preferred Reporting Items for Systematic Reviews and Meta-Analyses |

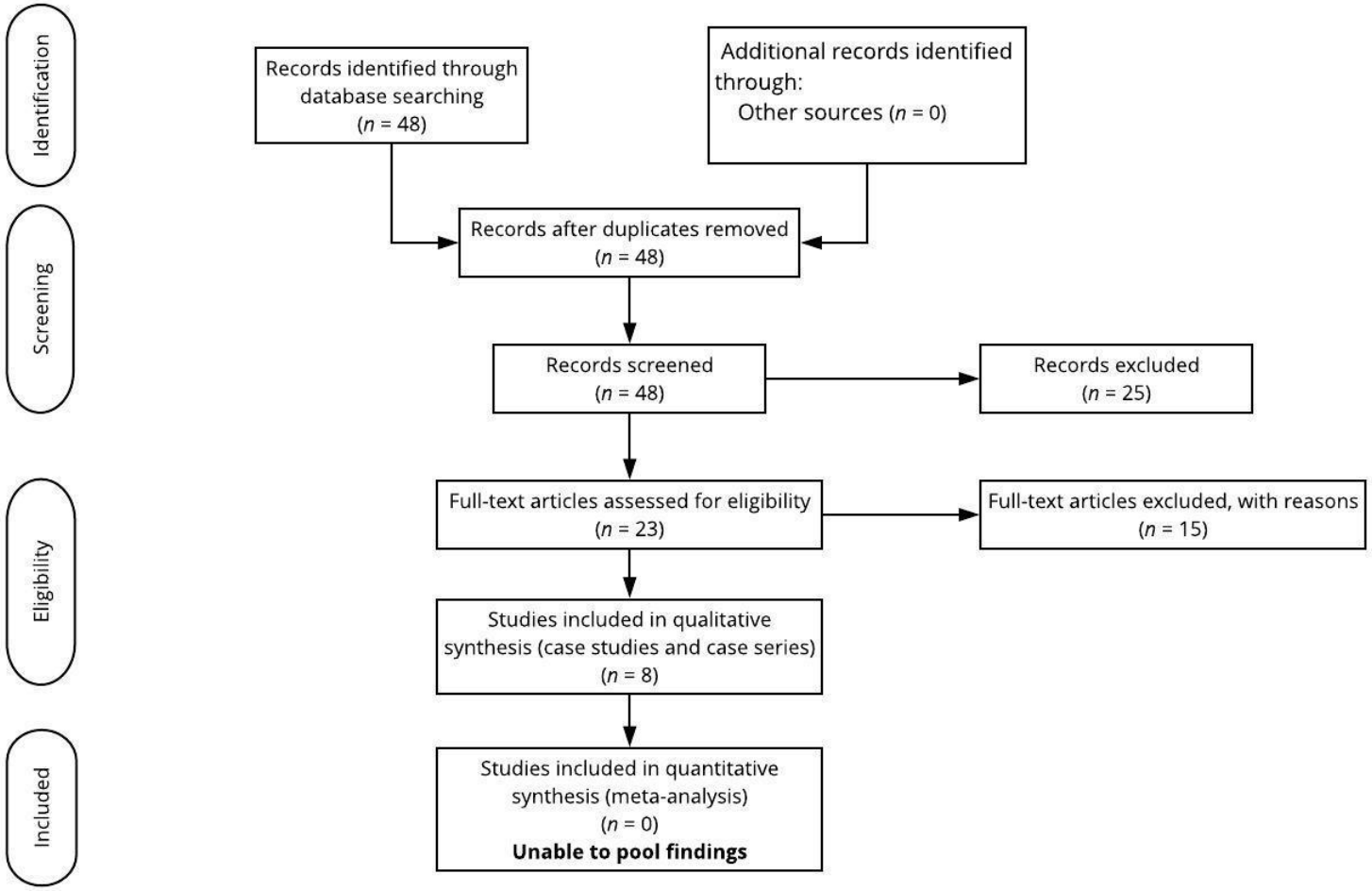


*Figure 1.* Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRIMSA)[b]

**Table 1**

*Diagnostic details for patients with diagnosis of eating disorders and pancreatitis*

| Source | Year | Number of cases | Findings |
|---|---|---|---|
| Backett | 1985 | 1 | • Anorexic patient<br>• Fifteen days after admission, patient developed abdominal discomfort.<br>• Diagnostics completed: serum amylase of 1535 U/l (normal range 50-300 U/l)<br>• Basic x-ray of the abdomen showed dilation of the gastrointestinal organs<br>• Diagnosed with acute pancreatitis |
| Birmingham & Boone | 2004 | 1 | • Bulimia nervosa patient found unresponsive and pronounced dead at scene<br>• Postmortem labs showed elevated liver function tests, amylase, and glucose<br>• Cause of death: acute hemorrhagic pancreatitis<br>• No radiological studies completed |
| Cox et al. | 1983 | 7 | • Seven of ten patients with anorexia nervosa showed elevated amylase creatinine clearance ratios (normal <4%)<br>• Only three of ten patients showed abnormal abdominal ultrasound results |
| Kim et al. | 2011 | 1 | • Patient with eating disorder having severe abdominal pain<br>• Serum amylase = 2,265 IU/L. Serum Lipase = 2,001 IU/L<br>• Diagnosis of pancreatitis on fifteenth day after admission using abdominopelvic computed tomography scan |
| Marano & Sangree | 1984 | 1 | • Bulimia nervosa patient with sudden abdominal pain<br>• Amylase of 259 U (normal 10 – 160 U) at admission, increased to 750 U<br>• Ultrasound of pancreas identified pancreatic cyst and inflammation<br>• Discussion supports diagnosis of pancreatitis |
| Morris et al. | 2004 | 1 | • Patient anorexia nervosa and bulimia nervosa having epigastric pain.<br>• Found to have acute pancreatitis.<br>• Admission serum amylase 50 IU/L (reference range: 53:123 IU/L) and lipase 399 IU/L (reference range: 10-150 IU/L).<br>• Abdominal CT and ultrasound revealed acute pancreatitis. |
| Urso et al. | 2013 | 1 | • Patient with eating disorder admitted due to collapse<br>• Marked increase in α-amylase 3620 U/L (normal value 28-100U/L), lipase 4102 U/L (normal 13-60 U/L)<br>• At discharge: α-amylase 262 U/L, lipase 256 U/L<br>• Imaging studies (ultrasound, computed tomography, and nuclear magnetic resonance) showed no abnormalities in the pancreas. |
| Wesson et al. | 2008 | 1 | • Patient with anorexia nervosa having epigastric pain<br>• Abdominal ultrasound revealed pancreatic lesion and confirmed with CT scan<br>• Histology completed following surgery to remove lesion which confirmed diagnosis of pancreatitis-results of labs not included in case study |

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