مجلة جامعة دمشق للعلوم الطبية المجلد: (٤١) العدد: ٤ (٢٠٢٥) الصفحات: (٨١-١٠٦)

Superior mesenteric artery syndrome (SMAS), a solution of the puzzle Systematic review of reported cases

Bayan Mahmoud Alsaid[*1]
[*1] Faculty of Medicine, Damascus University, Damascus, Syria.
bayan.alsaid@damascusuniversity.edu.sy

Abstract:

Introduction: Superior mesenteric artery syndrome (SMAS) is an uncommon medical condition. Symptoms associated with SMAS may mimic those of various other medical conditions, leading to potential delays in diagnosis. The decision between conservative management or surgical intervention often lacking clarity.

Methods: A systematic review was conducted, 474 cases out of 262 articles were analyzed.

Result: SMAS were predominantly observed in females during their second and third decades of life. A significant peak in incidence was noted among teenage patients. The primary pathology leading to SMAS was found to be surgical procedures, followed by psychiatric conditions.

Among the common symptoms reported, vomiting was the most frequent followed by abdominal pain and nausea. Weight loss was reported in approximately 40% of patients.

Conservative treatment was successful in 37.8% of all patient. Surgical intervention was ultimately chosen as the treatment of choice in 62.26% of cases. Notably, surgical treatment was more common in Europe compared to Asia and America. The duration of symptoms played a significant role in determining treatment strategy. Approximately 5% of cases reported persistent symptoms or complications, with 1.5% of mortality.

Conclusion: Superior mesenteric artery syndrome should be in the list of differential diagnosis of any epigastric pain with vomiting and weight loss, especially within teenage females. The duration of symptom could orient the treatment strategy in which the conservative treatment could attempt in patient with shorter duration of symptoms. Duodenojejunal anastomosis is the first line of surgical management.

Key Words: Superior Mesenteric Artery Syndrome, Wilkie's Syndrome, Conservative Treatment, Surgical Treatment.

Submitted: 7/4/2025 **Accepted:27/4/2025**

ISSN: 2789-7214 (online)
http://journal.damascusuniversity.edu.sy

متلازمة الشريان المساريقي العلوي، محاولة لحل اللغز
مراجعة منهجية لتقارير الحالات المنشورة

بيان محمود السيد*[1]

*[1] أستاذ مساعد – قسم التشريح–كلية الطب البشري– جامعة دمشق.

bayan.alsaid@damascusuniversity.edu.sy

الملخص:

المقدمة: متلازمة الشريان المساريقي العلوي حالة طبية نادرة. قد تتشابه أعراضها مع أعراض حالات طبية أخرى متنوعة، مما يؤدي إلى تأخير محتمل في التشخيص. كما أن الاختيار بين العلاج المافظ أو التدخل الجراحي مثار جدل.

المواد الطرائق: تم إجراء مراجعة منهجية، حيث تم تحليل بيانات ٤٧٤ تقرير حالة من ٢٦٢ مقالة.

النتائج: لوحظت متلازمة الشريان المساريقي العلوي بشكل رئيسي لدى الإناث خلال العقدين الثاني والثالث من العمر، مع ذروة ملحوظة في الإصابة بين المرضات في سن المراهقة. لوحظ أن السبب المرضي الرئيسي المؤدي إلى هو حالات نقص الوارد الغذائي ما بعد الإجراءات الجراحية، تليها الحالات النفسية. من بين الأعراض الشائعة، كان الاقياء، يليه الألم البطني فالغثيان. كما تم الإبلاغ عن فقدان الوزن في حوالي ٤٠٪ من المرضى.

كان العلاج المحافظ ناجحًا في ٣٧.٨٪ من إجمالي المرضى، بينما تم اختيار التدخل الجراحي كخيار علاجي في ٦٢.٢٦٪ من الحالات. ومن الجدير بالذكر أن العلاج الجراحي كان أكثر شيوعًا في أوروبا مقارنة بآسيا وأمريكا. كما أن مدة الأعراض لعبت دورًا مهمًا في تحديد استراتيجية العلاج. تم الإبلاغ عن أعراض مستمرة أو مضاعفات في حوالي ٥٪ من الحالات، مع معدل وفيات بلغ ١.٥٪

الاستنتاج: يجب إدراج متلازمة الشريان المساريقي العلوي ضمن قائمة التشخيص التفريقي لأي ألم شرسوفي مصحوب بقيء وفقدان وزن، خاصة لدى الفتيات المراهقات. يمكن أن توجه مدة الأعراض استراتيجية العلاج، حيث يمكن محاولة العلاج المحافظ في المرضى الذين يعانون من أعراض لفترة أقصر. تعد مفاغرة العفجية الصائمية الخيار الجراحي الأول في العلاج.

الكلمات المفتاحية: متلازمة الشريان المساريقي العلوي، متلازمة ويلكي، العلاج المحافظ، العلاج الجراحي.

تاريخ الإيداع :٢٠٢٥/٤/٧ تاريخ القبول:٢٠٢٥/٤/٢٧

Introduction:

Superior mesenteric artery syndrome (SMAS) is a condition in which the third portion of the duodenum becomes compressed between the abdominal aorta and the superior mesenteric artery. The typical angle between the two arteries ranges from 28 to 65 degrees, with a normal measurement of around 45 degrees. The distance between the aorta and superior mesenteric artery as they pass through the duodenum usually falls between 13 to 34 mm (1). The reduction of retroperitoneal fat pad is believed to be the primary reason for the aortomesenteric angle decreasing to less than 20 degrees and the aortomesenteric distance shortening to less than 10 mm (2). The incidence of this rare pathological condition varies from 0.013 to 0.3% (3). The first documented case of duodenal obstruction due to compression by the superior mesenteric artery was reported by Austrian professor Carl von Rokitansky in 1842 (4). In 1927, Wilkie presented a detailed series of 75 cases, leading to another commonly used name for superior mesenteric artery syndrome, which is Wilkie syndrome (5).

Symptoms of SMAS may mimic various other medical conditions. Typical symptoms include upper abdominal pain, vomiting, nausea, and weight loss (2, 3, 6).

Diagnosing SMAS can be challenging due to the non-specific nature of the symptoms. Diagnostic imaging such as CT scans may be necessary to rule out other conditions and confirm SMAS by assessing the aortomesenteric angle and distance. Additional diagnostic tools like barium swallow, endoscopy, and doppler ultrasound can also aid in confirming the diagnosis(2, 3).

Treatment for SMAS remains a topic of debate, with the choice between conservative and surgical approaches not always straightforward. Conservative treatments may involve high-calorie enteral feeding via oral intake or a nasojejunal tube, as well as total parenteral nutrition. Surgical options, such as duodenal mobilization techniques like Strong's procedure, gastrojejunostomy, or duodenojejunostomy, may also be considered.

In the medical literature, numerous articles have been published to investigate this cause of upper intestinal obstruction. Most of them were either case reports or serial case reports, with a limited number of cohort studies having an adequate number of patients.

The largest cohort study included 80 cases studied retrospectively by Lee et al. in 2012 (2), Jiain et al. (7) revised the results of laparoscopic duodenojejunal anastomosis in 22 patients and Tang et al. (8) in 9 patients, other limited cohort studies introduce the experience in sample of approximately twenty patients (٩-١٢) .

Some reviews (3, 13) and systematic reviews (6, 14) were performed; none of them contained a large number of SMAS cases.

In this study, a systematic review was conducted for all reported cases and studies to enhance our understanding of this particular syndrome.

Materials and methods:

Study Population and Search Strategy

Between 1963 and Jully 2024 using the PubMed database (US National Library of Medicine, Bethesda, Maryland), a systematic medical literature search was conducted to identify the articles describing the SMAS. Using the following key words “("superior mesenteric artery syndrome" OR "wilkie's syndrome") AND ("treatment" OR "therapy" OR "post-operative" OR "surgery" OR "surgical" OR "duodenojejunostomy" OR "duodenal derotation" OR "gastrojejunostomy" OR "conservative treatment" OR "complications"), 935 articles were identified.

Selection Criteria

The systematic review started from a very broad search process to include every possible article. The systematic review commenced with an extensive search process aimed at encompassing all potential articles. Subsequently, the search was refined to include only English or French original articles, case reports, case series, editorial letters and cohort studies detailing the SMAS. Articles lacking pertinent data were then incorporated into the exclusion criteria.

Selection of Data

Studies for review were chosen based on their titles or abstracts. Those studies that satisfied the inclusion criteria were included in the review. In cases where it was uncertain from the abstract whether a study met the inclusion criteria, the full article was obtained for additional assessment. A total of 648 articles were initially selected based on their titles, with 497 articles selected based on their abstracts. The full text of 366 articles was then examined, and 262 articles were ultimately included for data extraction, provided they presented a case report or case series of SMAS.

Figures legends

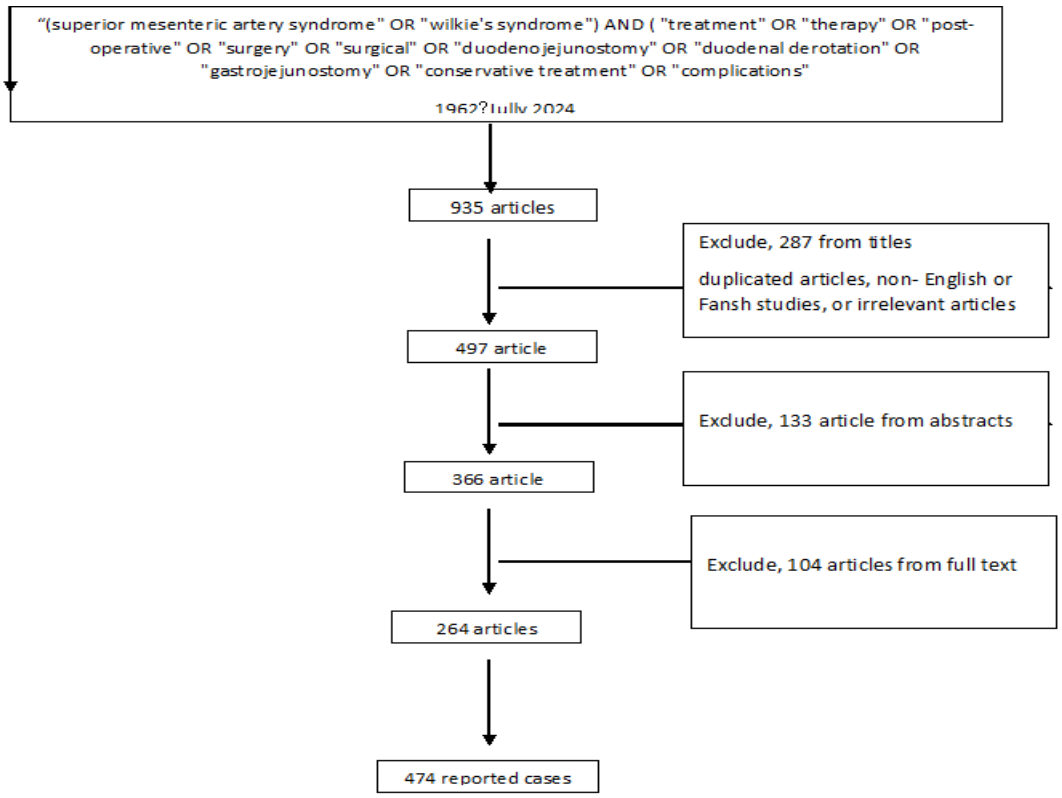

Figure 1: The selection process of the study results,

Data Extraction

In total, 474 cases (out of 262 articles (15-279)) of reported SMAS were selected to establish our database.

The data extracted from each article included the author's name, publication year, countries involved, patient age, patient weight, body mass index (BMI), adjacent pathologies and antecedents, main symptoms, duration of symptoms, weight loss, diagnosis procedure, aortomesenteric angle and distance, details of conservative or surgical procedures, and follow-up outcomes. This extracted data was organized into an Excel table and a statistical analysis was conducted using SPSS software.

Results:

Age and gender

The data extracted from 474 reported cases indicated that the SMAS were more frequently observed in females during their second and third decades of life. 62.66% of all patients were female, and 37.4 % were male. 65.4% of all cases were reported in patients aged between 15 and 45 years old. The mean age was 31.06 years (SD± 19.30). The mean age among males was slightly higher than among females (32.32 years versus 30.31 years) with no statistical significance (p value 0.13). A notable observation was the prevalence of SMAS among teenage patients; 24% of the patients (114/474) were between 16-20 years old (Figure 2).

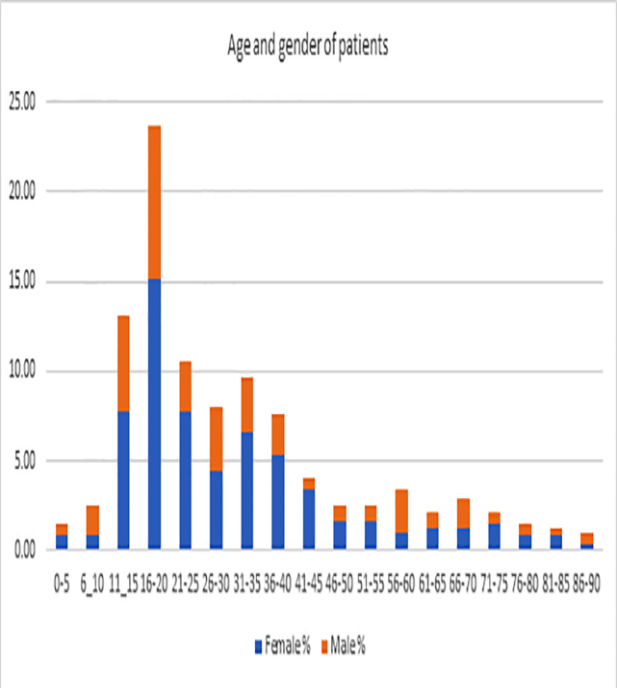

Figure 2. Percentage of female and male patients according to age,

Demographic distribution

The cases reported originated from various geographical areas with no specific distribution. Cases from America accounted for 26.69% of the total reported cases, while those from Europe were 28.27%, from East Asia 27.43%, from the Middle East 10.13%. and from Australia 4%. There was no significant difference in the male/female ratio, the mean of the age, and the aortomesenteric angle and distance (Table 1, Table 2).

Table 1. Comparison according geographic area

	America	Asia	Europe	Middle east	Australia
Percentage of all patients	29.9%	28.3 %	27.4 %	10.13 %	4%
Mean of Age	31.79 y	35.11 y	28.75 y	22.69 y	35.52 y
Females	65.3%	54.6 %	70.1 %	55.2 %	66.6%
Males	34.7%	45.4 %	29.9 %	44.8 %	33.4%

Table 2. Comparison AM angle and distance

	Mean of Angle in degrees	Mean of Distance in mm
In all patients	15.38°	5.84 mm
In females	15.23°	5.98 mm
In males	15.71°	5.64 mm
In American patients	14.24°	5.95 mm
In Asiatic patients	15.20°	6.50 mm
In European patients	16.62°	5.71 mm

Aortomesenteric angle and distance

The mean of aortomesenteric (AM) angle was 15.38 (SD± 6.5), mean of distance between aorta and superior mesenteric artery was 5.84 mm (SD± 2.2). No difference was noted in the angle or distance measurement between gender or geographic area.

Co-morbid Conditions

The most commonly reported pathology leading to SMAS was the surgical procedure (30.9%), followed by psychiatric conditions (16.2%) with a prevalence of anorexia nervosa. 13.2% of reported cases were a complication of scoliosis (Figure 3).

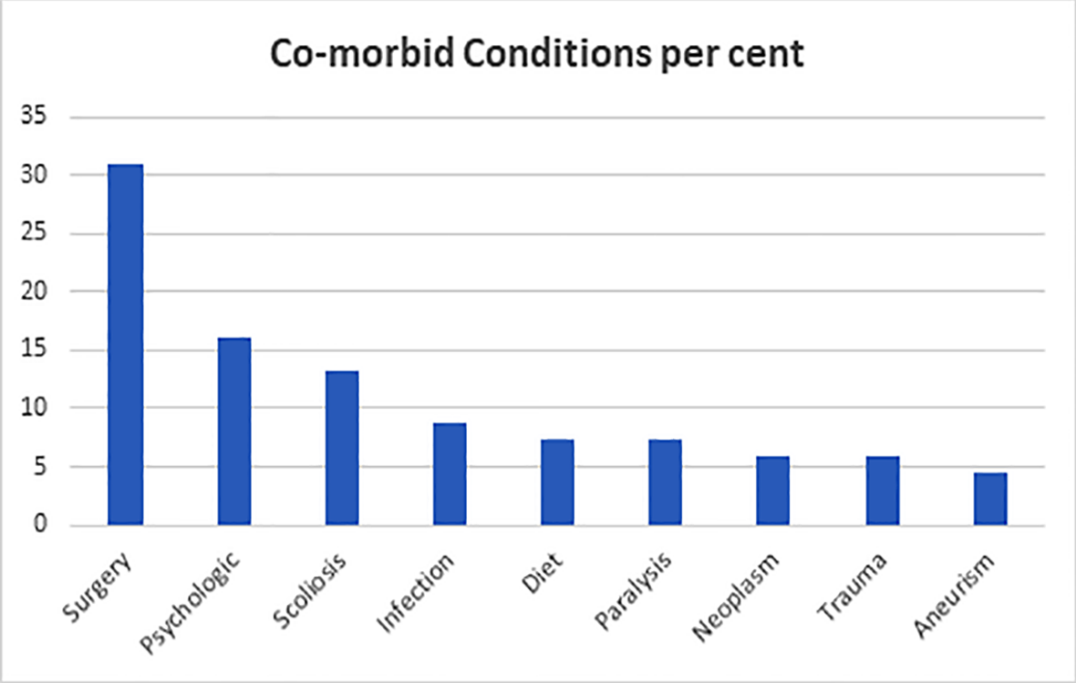

Figure 3. Percentage of adjacent pathologies.

Symptoms

Vomiting was the most frequent symptom in 74.26% of cases, followed by abdominal pain in 63.7% of cases and nausea in 31.22%. Weight loss was reported in about 40% of patients, with a mean patient weight of 41.05 kg (SD ±12.50) and a BMI of 17.8 kg/m2 (SD ±4.99). The mean weight loss was 11.9 kg (SD ±8.75) over a mean symptom duration of 11.8 months (SD ±11.11). 46.45% of patients had symptoms for less than 6 months, while 27.06% had symptoms between 6 and 12 months and 26,45% their symptom persist for more than a year.

Diagnosis

Computed tomography was the standard diagnostic method in 73.6% of cases, followed by barium meal in 15.3%, and endoscopy or echo Doppler in about 10% of cases.

Treatment

The data of treatment was collected from 469 patients, with 231 of them (49.25%) undergoing conservative treatment. There were three types of conservative treatment utilized: hyper calories enteral nutrition per os (95/231, 41.1%), per nasojejunal tube (NJT) in (78/231, 33.8%) or total parenteral nutrition (TPN) (58/231, 25.1 %). The conservative treatment was successful in 37.8% of all patients (76.6% of those who underwent conservative treatment), while 23.38% of patients who received conservative treatment did not respond well and were referred for surgery (Table 3).

Surgical treatment was chosen as the option for 62.26% of all patients (292/469). Among the surgical patients, 215 underwent duodenojejunal anastomosis (DJA) (215/292 patients,73.6% of surgical procedures), while gastrojejunal anastomosis (GJA) was performed in 11.6% of surgical procedures. Additionally, 6 patients who had gastro-jejunal anastomosis had previously undergone duodenojejunal anastomosis. The Strong

technique (lithiasis of Treitz ligament) was used in 14.7% of surgical procedures (Table 3).

Open surgery was preferred in 52% of cases, while laparoscopic surgery was utilized in 40% of cases. Robotic or endoscopic GJ anastomosis were less common, accounting for 2.7% and 2.4% of surgical cases, respectively. Surgical treatment was more prevalent in Europe compared to Asia and America (66.17%, 59.8%, 53.9% respectively).

Table 3. percentage and types of conservative and surgical treatments

	Number of patients	Percentage
Total conservative essay	231	49.25 %
Success of conservative	177	76.62 %
Failed of conservative	54	23.38 %
Oral hyper calories diet	95	41.13 %
Nasojejunal tube (NJT)	78	33.77 %
Total parenteral nutrition (TPN)	58	25.11 %
Total surgical intervention	292	62.26 %
Open surgery	152	52.05 %
Laparoscopic surgery	117	40.07 %
Robotic surgery	8	2.74 %
Duodeno-jejunal anastomosis (DJA)	215	73.63 %
Duodeno-jejunal failed	6	2.05 %
Gastro-jejunal anastomosis (GJA)	34	11.64 %
Lithiasis of Treitz ligament	43	14.73 %
GJA after DJA	6	2.05 %
Endo DJA	7	2.4 %

Factors that impact the treatment approach

When analyzing the outcomes of various treatment methods to gain a better understanding of the factors that can affect the treatment plan, patients were divided into three categories: those who responded well to conservative treatment, those for whom conservative treatment failed, and those who required surgical intervention. The average age of patients across the three groups was similar (29.8, 29.7, and 31.7 years). There was a higher percentage of female patients in the surgical group compared to those who responded successfully to conservative treatment (67% vs. 57.03%). The AM angle and AM distance were slightly higher in patients who responded well to conservative treatment compared to those who underwent surgery, although the difference was not statistically significant (16.42° vs. 17.2°, P value=0.09 and 6.01 mm vs. 5.71 mm, P value=0.8). The duration of symptoms could play a role in determining the treatment approach, with patients who experienced longer symptom duration being more likely to fail conservative treatment (Figure 4).

The longer the duration of symptoms, the higher the likelihood of conservative treatment failure. Patients with symptoms lasting less than six months had a 61.82% success rate with conservative treatment. 62% from the patients with symptoms for more than six months underwent surgery.

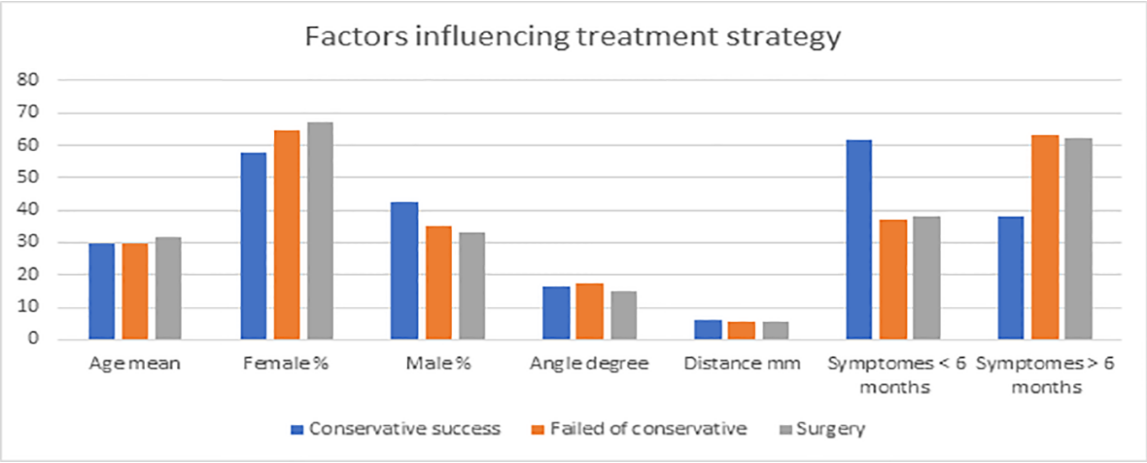

Figure 4. Factors influencing treatment strategy.

Influence of durations of symptoms

The impact of symptom durations was examined by categorizing patients into two groups based on the length of their symptoms: less than 6 months and more than 6 months. A detailed analysis was conducted to compare the two groups (Figure 5). It was found that females had longer symptom durations, with 54% of males experiencing symptoms for less than six months compared to 68.6% of females who had symptoms for more than 6 months. Patients with longer symptom durations were younger, with a statistically significant age difference (26.1 years vs 33.8 years, p = 0.003). Additionally, the AM angle was higher in patients with longer symptom durations, although this difference was not statistically significant (15.38° vs 16.42° p = 0.16), AM distance was similar within the two groups (5.4 mm vs 5,5 mm, p= 0.35).

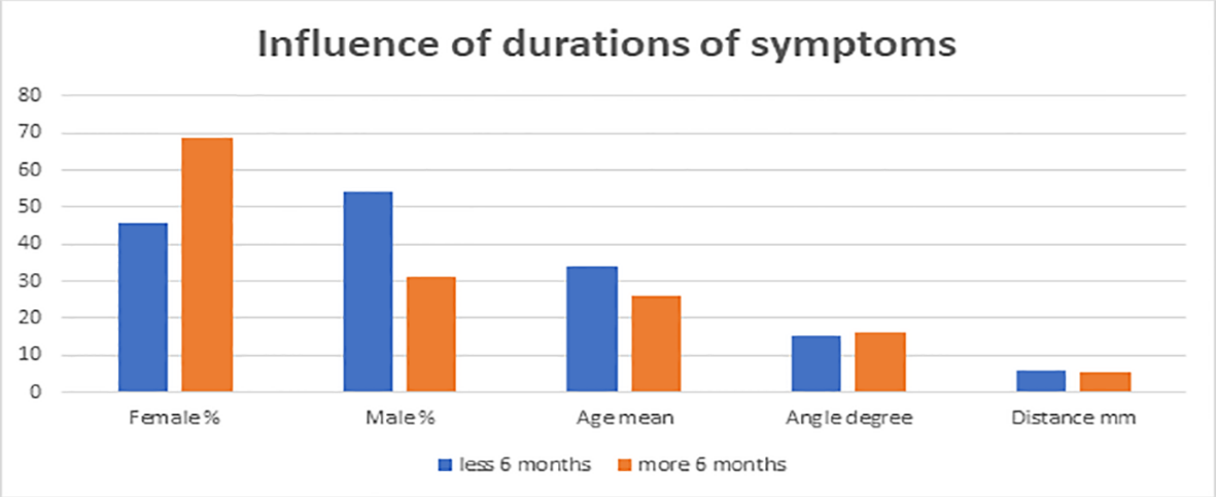

Figure 5. Influence of durations of symptoms regarding gender, age and aortomesenteric angle and distance

Follow up

During the follow-up period, the average duration was 15 months, with an average weight gain of approximately 8 kg (SD± 5kg). The majority of patients reported being asymptomatic after treatment and in good condition. However, about 5 % of cases (23/474) reported persistent symptoms or complications, with seven deaths (1.5% of all reported cases) due to complications.

Discussion:

The syndrome known as Superior Mesenteric Artery Syndrome (SMAS) involves a partial obstruction of the upper gastrointestinal tract caused by the compression of the duodenum between the aorta and the superior mesenteric artery. Since its initial description by Rokitansky in 1842 (4)and its clinical correlation by Willet in 1927 (5), numerous studies have been conducted in an effort to enhance our comprehension of this rare syndrome(2, 3, 6-14, 280-282), yet there remains a lack of standardized treatment for SMAS. This study aims to provide a detailed analysis of a large number of reported cases to offer a more comprehensive understanding of the characteristics and management strategies for this condition.

The typical angle between the aorta and the SMA varies from 25 to 60 degrees, while the normal aortomesenteric distance ranges from 10 to 28 mm(1, 2). A reduction of this angle to below 20 degrees is caused by a decrease in retro duodenal fat pad due to severe weight loss, congenital or acquired deformities.

In our data mean of aortomesenteric angle was about 15 degrees, and the mean of distance between aorta and superior mesenteric artery was 5.84 mm with no significance between gender, geographic area or symptoms duration.

Regarding our data, females are predominantly impacted by the syndrome, 62.66% of the patients

were female especially in their second and third decades of life.

The results are consistent with previous research (2, 3, 9), the high occurrence in women possibly attributed to the higher prevalence of coexisting eating disorders.

65.4% of all cases were reported in patients aged between 15 and 45 years old. The mean age was 31.06 years and it was slightly higher among males.

It is important to underscore the high occurrence of SMAS among teenage patients with around a quarter of the patients belonging to this age group.

The age of those affected is often associated with the underlying predisposing condition, such as scoliosis surgery during childhood or adolescence. However, cases of the syndrome have also been reported in patients older than 60 years in about 10% of cases.

The reported cases were sourced from different geographical regions without a distinct pattern. The incidence of cases was fairly consistent across America, Europe, and East Asia, with a nearly equal split between males and females. There was no significant dominance of any particular region, considering that the data was sourced from only published cases.

It has been noted that superior mesenteric artery syndrome is often triggered by a sudden change in the patient's condition, complicating a chronic and debilitating disease (101).

Three main conditions can lead to superior mesenteric artery syndrome: severe weight loss in catabolic states, external factors, and intra-abdominal compression or mesenteric tension (3).

Based on our data, the average cause of SMAS as reported in most cases was the surgical procedure, followed by psychiatric disorders and scoliosis.

Thus, our results suggest the importance of considering the diagnosis of SMAS in postoperative hospitalized patients, given that these individuals may experience challenges in receiving a timely diagnosis due to the overlap of surgical complications and syndrome-related symptoms.

The findings of Lee et al. (2) differed from our data, as they reported that mental and behavioral disorders, infectious diseases, and neurological disorders were commonly observed as co-existing conditions in their 80 patients diagnosed with SMAS.

There is a strong association between SMAS and psychiatric disorders, specifically anorexia nervosa (115, 133, 136, 214, 223, 226, 249). The uncertainty lies in whether mental and behavioral disorders heighten the likelihood of developing SMAS.

Following scoliosis surgery, the superior mesenteric artery syndrome is a commonly recognized complication as a result of the spine lengthening after the procedure (3).

Nevertheless, most of the mentioned co-morbid conditions have the potential to result in malnutrition and weight loss, ultimately leading to a decrease in aortomesenteric fat.

The prevalence of SMA syndrome is reported to less than 0.34% of population, however, this prevalence could potentially be elevated in chronic-care hospital patients (283).

In the 1980s Hines et al. (101) found that only 14.6% of 44 patients previously diagnosed with superior mesenteric artery syndrome met the strict radiographic criteria, suggesting that overdiagnosis may be an issue. The development of radiologic investigation procedures such as CT angiography has improved the detection of this syndrome(1). CT angiography is the best diagnostic method if available, it is utilized to confirm the diagnosis of SMAS by measuring the aortomesenteric angle, while dynamic upper gastrointestinal studies were employed to illustrate obstruction at the duodenum. In the past, barium swallowing was also utilized for this purpose. In our data the computed tomography was the golden standard diagnostic method in 73.6% of cases, followed by barium meal in 15.3%, and endoscopy or echo Doppler in about 10% of cases.

The diagnosis of SMAS is usually a diagnosis of exclusion. Symptoms may include epigastric pain, nausea, vomiting, and weight loss.

In our data, vomiting was the most frequent symptom in 74.26% of cases, followed by abdominal pain in 63.7% of cases and nausea in 31.22%. Weight loss was reported in approximately 40% of patients. These findings are consistent with the report by Lee et al. (2), and slightly divergent from some other studies in which the most common presenting symptom was postprandial abdominal pain (3, 48).

Evaluating the effectiveness of conservative treatment versus surgical treatment solely based on

individual case reports or small case series can be challenging. The majority of these publications are biased towards highlighting the advantages of one treatment over the other (7, 8, 71, 90, 101, 144-146, 219, 261, 263). To make an objective assessment of the superiority between these two treatments, studies with a larger sample size are necessary.

In the largest group of Lee et al.(2), (87.7 %) of patients were managed medically at initial admission, with success being observed in (78.1 %) of patients. Chronic ailments linked to weight loss like tuberculosis, along with nervous system disorders such as cerebral palsy, muscular dystrophy, and Parkinson's disease, were frequently observed as comorbidities in SMAS patients. Nevertheless, the prevailing comorbid condition in that particular group was psychiatric illness.

The management of superior mesenteric artery syndrome typically commences with conservative methods. The initial steps of conservative therapy involve decompressing the dilated stomach and duodenum through postural changes (prone or left lateral decubitus position)(284), inserting a nasogastric tube with suction for duodenal and gastric decompression(162), and administering intravenous medication to enhance gastric motility such as metoclopramide(22). The aforementioned methods is frequently successful during the acute stage. Weight gain can be facilitated through the administration of numerous small meals or a feeding tube. Nasogastric feeding is efficient, although the jejunal tube is considered more optimal, and the assistance of an endoscopic specialist should be taken into account(126). Enteral jejunal tube feeding combined with hyperalimentation has demonstrated favorable results in certain patients. Total parenteral nutrition offers a beneficial alternative for the initial delivery of nutrients, particularly in cases where enteral feedings are not tolerated

Cases of superior mesenteric artery syndrome with a short duration appear to respond better to conservative therapy (3). Our data confirms this point, when the symptoms lasting less than six months the success rate of conservative treatment was higher.

Medical intervention focuses on correcting fluid and electrolyte imbalances, achieving a positive nitrogen balance, and promoting weight gain to aid in the restoration of retroperitoneal fat tissue and subsequent increase in the aortomesenteric angle.

The duration of medical treatment is not specifically outlined, as relief from symptoms and gaining weigh has been noted in some patients within two weeks(63, 226), although treatment for several weeks has been documented (126, 143). Many reports indicated that conservative treatment was unsuccessful if it failed to yield the intended outcomes within a two-month period (113, 207, 208, 260).

Out of the 469 patients from whom we were able to collect therapeutic management data, 231 of them (49.25%) received conservative treatment, this type of treatment was not always the first choice of physicians dealing with SMAS. The conservative approach yielded positive results in only 37.8% of the total patient population (76.6% of those who underwent conservative treatment), with 23.38% of patients who received conservative treatment showing poor response and subsequently being recommended for surgery.

Various surgical techniques such as Strong's operation, gastrojejunostomy and duodenojejunostomy have been utilized to either resolving or bypassing the duodenal compression.

Strong (285) was the first to describe the division of the ligament of Treitz along with mobilization of the third and fourth duodenal parts to achieve caudal displacement of the duodenum. This procedure offers advantages such as being less invasive, quicker, and safer as it maintaining the integrity of the intestines. It has also been associated with a faster postoperative recovery. However, it has a reported failure rate, likely due to the short branches of the inferior pancreaticoduodenal artery not allowing the duodenum to descend inferiorly (2). Other disadvantages to consider, including the possibility of complications or impossibility of achievement due to adhesions. However, some recent reports demonstrate that Strong procedure is still one of surgical possibilities and mentioned the performance of this operation by either laparoscopic or robotic surgery (36, 132, 193). Even though in our data the utilization of this operation was noted in only about 15% of cases.

Gastrojejunostomy was also one of the surgical choices (50, 136), it has been used in about 12% of in our collected data. Gastrojejunostomy effectively

decompresses the stomach, but it does not fully resolve duodenal obstruction, which may result in persistent symptoms, blind loop syndrome, or gastric bile reflux, requiring duodenojejunostomy in certain situations (256).

In other reports, gastrojejunostomy was the surgical choices after the failure of duodenojejunostomy (151).

Gastrojejunostomy could be performed using laparoscopic(127), robotic (187) surgery, or via less invasive endoscopic ultrasound-guided gastrojejunostomy(227).

Bloodgood (286) first suggested duodenojejunostomy for patients with chronic duodenal ileus, and it was performed by Stavely in 1908 (287). Duodenojejunostomy has since become the most common surgical procedure with a good outcome. It was the choice in about 75% in our data,

Duodenojejunostomy has shown the best results in severe cases and is more effective than gastrojejunostomy and Strong's procedure (2, 8).

In brief, this process entails mobilizing a loop of jejunum about 20 cm distal to the ligament of Treitz and connecting it to the dilated second part of the duodenum to relieve pressure and create a detour around the blocked area. Recent advancements in laparoscopic surgery have led to the development of laparoscopic and robotic duodenojejunostomy (43, 199).

Duodenojejunostomy is a simple procedure with a minimal risk of post-operative adhesions and a high success rate (2, 3). 73.6% of surgeons in our data prefer duodenojejunostomy.

Upon analyzing the results of different treatment methods to comprehend the factors influencing the treatment plan, the average age of patients did not influent the success of treatment choice. The difference in AM angle and AM distance between patients who responded well to conservative treatment and those who underwent surgery was not significant.

The gender and the duration of symptoms might influence the treatment approach. Female patients were more observed in the surgical group compared to those who had successful conservative treatment (67% vs. 57.03% respectively), also females tended to have longer symptom durations. Patients with longer symptom durations were generally younger. Notably, a difference was noted when comparing the average of symptom durations among patients who received successful conservative treatment, unsuccessful conservative treatment, and those who underwent surgery. Patients with longer symptom duration were more likely to have unsuccess conservative treatment.

Surgical intervention was more common in Europe than in Asia and America, with rates of 66.17%, 59.8%, and 53.9% respectively. American physicians appear to offer the chance for conservative therapy.

Although the SMAS is rare and generally safe syndrome, a small number of patients may experience complications, with reported incidence of 5%, and mortality rate of 1.5%. Despite the modest nature of these percentages, they confirm the importance of timely and precise detection of this syndrome, as well as its proper management.

This study is limited by its reliance on published case reports, which may be biased by the authors preferences. Randomized controlled trials or multicenter prospective studies are needed to gain a better understanding of this rare syndrome and to standardize treatment strategies

Conclusion:

Superior mesenteric artery syndrome must be considered in the differential diagnosis of epigastric pain accompanied by vomiting and weight loss, particularly in females in the late second age decade. The duration of symptoms may guide the treatment approach, with conservative treatment being an option for patients with a shorter symptom duration. Duodenojejunal anastomosis is the primary surgical management option.

Acknowledgments:

The author thanks Nagham Alsaid Abdullah Altwer for her assisting with the filtration of articles.

Conflicts of Interest

The author declare that they have no conflicts of interest.

Finding

No Finding received for this study

Funding information: this research is funded by Damascus university – funder No. (501100020595).

References:

1. Konen E, Amitai M, Apter S, Garniek A, Gayer G, Nass S, et al. CT angiography of superior mesenteric artery syndrome. AJR Am J Roentgenol. 1998;171(5):1279-81.
2. Lee TH, Lee JS, Jo Y, Park KS, Cheon JH, Kim YS, et al. Superior mesenteric artery syndrome: where do we stand today? Journal of gastrointestinal surgery : official journal of the Society for Surgery of the Alimentary Tract. 2012;16(12):2203-11.
3. Welsch T, Buchler MW, Kienle P. Recalling superior mesenteric artery syndrome. Digestive surgery. 2007;24(3):149-56.
4. Rindfleisch GEv. Lehrbuch der pathologischen Gewebelehre : zur Einfu**hrung in das Studium der pathologischen Anatomie. Zweite Auflage. ed. Leipzig: Verlag von Wilhelm Engelmann; 1871. xvi, 633 p. p.
5. DPD W. Chronic duodenal ileus. Am J Med Sci. 1927;173::643-9.
6. Oka A, Awoniyi M, Hasegawa N, Yoshida Y, Tobita H, Ishimura N, et al. Superior mesenteric artery syndrome: Diagnosis and management. World journal of clinical cases. 2023;11(15):3369-84.
7. Jain N, Chopde A, Soni B, Sharma B, Saini S, Mishra S, et al. SMA syndrome: management perspective with laparoscopic duodenojejunostomy and long-term results. Surg Endosc. 2021;35(5):2029-38.
8. Tang J, Zhang M, Zhou Y, Cao G, Li S, Zhang X, et al. Laparoscopic lateral duodenojejunostomy for pediatric superior mesenteric artery compression syndrome: a cohort retrospective study. BMC Surg. 2023;23(1):365.
9. Biank V, Werlin S. Superior mesenteric artery syndrome in children: a 20-year experience. J Pediatr Gastroenterol Nutr. 2006;42(5):522-5.
10. Geskey JM, Erdman HJ, Bramley HP, Williams RJ, Shaffer ML. Superior mesenteric artery syndrome in intellectually disabled children. Pediatric emergency care. 2012;28(4):351-3.
11. Shiu JR, Chao HC, Luo CC, Lai MW, Kong MS, Chen SY, et al. Clinical and nutritional outcomes in children with idiopathic superior mesenteric artery syndrome. J Pediatr Gastroenterol Nutr. 2010;51(2):177-82.
12. Wan S, Zhang L, Yang J, Gao X, Wang X. Superior Mesenteric Artery Syndrome Improved by Enteral Nutritional Therapy: A Retrospective Case-Series Study in a Single Institution. Ann Nutr Metab. 2020;76(1):37-43.
13. Mathenge N, Osiro S, Rodriguez, II, Salib C, Tubbs RS, Loukas M. Superior mesenteric artery syndrome and its associated gastrointestinal implications. Clin Anat. 2014;27(8):1244-52.
14. Jonas JP, Rossler F, Ghafoor S, Kobe A, Pfammatter T, Schlag C, et al. Surgical therapy of celiac axis and superior mesenteric artery syndrome. Langenbecks Arch Surg. 2023;408(1):59.
15. Alvarenga A, Espinheira C, Guerra P, Garcia M, Abreu M, Campos M. Superior Mesenteric Artery Syndrome: Weight Loss Can Be a Problem, Weight Gain Can Be a Solution. GE Portuguese journal of gastroenterology. 2017;24(1):43-6.
16. Amadi C, Anderson S. Refractory coeliac disease: or is it? BMJ case reports. 2017;2017.
17. Anderson CM, Dalrymple MA, Podberesky DJ, Coppola CP. Superior mesenteric artery syndrome in a basic military trainee. Military medicine. 2007;172(1):24-6.
18. Andrew BD, Hamed AB, Gourash W, Ahmed BH. Laparoscopic duodenojejunostomy to manage small bowel obstruction due to superior mesenteric artery syndrome after Roux-en-Y gastric bypass. Surgery for obesity and related diseases : official journal of the American Society for Bariatric Surgery. 2021;17(1):242-4.
19. Aneiros Castro B, Cano Novillo I, García Vázquez A, Martín Alelu R, Gómez Fraile A. Wilkie's syndrome in monozygotic twins treated by 3-D laparoscopic duodenojejunostomy. Asian journal of endoscopic surgery. 2019;12(1):125-7.

20. Ang D. Duodenoduodenostomy in the Treatment of Superior Mesenteric Artery Syndrome. The American surgeon. 2023;89(4):1290-2.
21. Apostu RC, Chira L, Colcear D, Lebovici A, Nagy G, Scurtu RR, et al. Wilkie's syndrome as a cause of anxiety-depressive disorder: A case report and review of literature. World journal of clinical cases. 2022;10(5):1654-66.
22. Applegate GR, Cohen AJ. Dynamic CT in superior mesenteric artery syndrome. Journal of computer assisted tomography. 1988;12(6):976-80.
23. Asbah M, Shrateh ON, Musleh A, Abbadi K, Nofal M, Tarifi S. Superior mesenteric artery syndrome in a 30-year-old male patient: A case report and literature review. International journal of surgery case reports. 2023;106:108267.
24. Aslam MI, Finch JG. Prolonged gastroparesis after corrective surgery for Wilkie's syndrome: a case report. Journal of medical case reports. 2008;2:109.
25. Ayloo SM, Masrur MA, Bianco FM, Giulianotti PC. Robotic Roux-en-Y duodenojejunostomy for superior mesenteric artery syndrome: operative technique. Journal of laparoendoscopic & advanced surgical techniques Part A. 2011;21(9):841-4.
26. Badour M, Mahmoud G, Hasan A, Sulaiman W, Hammed A. A case of superior mesenteric artery syndrome got physicians in trouble. Journal of surgical case reports. 2021;2021(1):rjaa613.
27. Bajour D, Haddad S, Marina S, Zoukar S, Haddad S, Martini N, et al. Co-occurrence of ectopic pancreas and superior mesenteric artery syndrome in a child: A case report and literature review. SAGE open medical case reports. 2024;12:2050313x231220830.
28. Baker MT, Lara MD, Kothari SN. Superior mesenteric artery syndrome after laparoscopic Roux-en-Y gastric bypass. Surgery for obesity and related diseases : official journal of the American Society for Bariatric Surgery. 2006;2(6):667.
29. Barchi LC, Alves AM, Jacob CE, Caldas Bresciani CJ, Yagi OK, Nogueira TG, et al. Favorable minimal invasive surgery in the treatment of superior mesenteric artery syndrome: Case report. International journal of surgery case reports. 2016;29:223-6.
30. Barkhatov L, Tyukina N, Fretland Å A, Røsok BI, Kazaryan AM, Riis R, et al. Superior mesenteric artery syndrome: quality of life after laparoscopic duodenojejunostomy. Clinical case reports. 2018;6(2):323-9.
31. Barquín Yagüez J, Abadía Barnó P, García Pérez JC. Superior mesenteric artery syndrome: an uncommon cause of intestinal obstruction. Revista espanola de enfermedades digestivas. 2017;109(1):60.
32. Barsoum MK, Shepherd RF, Welch TJ. Patient with both Wilkie syndrome and nutcracker syndrome. Vascular medicine (London, England). 2008;13(3):247-50.
33. Bartolucci R, Battaglia L, Rabitti G. Five-centimeter superior mesenteric artery aneurysm. A case report. Chirurgia italiana. 1999;51(4):317-20.
34. Bernotavicius G, Saniukas K, Karmonaite I, Zagorskis R. Superior mesenteric artery syndrome. Acta Med Litu. 2016;23(3):155-64.
35. Bhattacharya D, Kamel M, McAuley D. Superior mesenteric artery syndrome (Wilkie's syndrome) complicating recovery from posterior fossa surgery in a child--a rare phenomenon. Child's nervous system : ChNS : official journal of the International Society for Pediatric Neurosurgery. 2008;24(3):365-7.
36. Bing L, Shun-Lin X, Ji-Hua O, Wei-Bing C, Ye-Bo W. Laparascopic Ladd's procedure as treatment alternative, when parenteral or prolonged hospital nutrition is not an option for superior mesenteric artery syndrome. Journal of pediatric surgery. 2020;55(3):554-7.
37. Blebea J, Sax HC, Geary KJ, Ouriel K. Superior mesenteric artery syndrome after end-to-side aortofemoral bypass. Journal of vascular surgery. 1990;11(5):726-7.
38. Bohanon FJ, Nunez Lopez O, Graham BM, Griffin LW, Radhakrishnan RS. A Case Series of Laparoscopic Duodenojejunostomy for the Treatment of Pediatric Superior Mesenteric Artery Syndrome. International journal of surgery and research. 2016;2016(Suppl 1):1-5.

39. Bonnet JP, Louis D, Foray P. [Superior mesenteric artery syndrome]. Archives de pediatrie : organe officiel de la Societe francaise de pediatrie. 1995;2(4):333-8.
40. Booka E, Kawakubo H, Ishii K, Hikata T, Fukuda K, Nakamura R, et al. Superior Mesenteric Artery Syndrome Caused by Massive Lumbar Osteophytes: A Case Report. Spine. 2015;40(15):E909-12.
41. Bronswijk M, Fransen L, Vanella G, Hiele M, van der Merwe S. Successful treatment of superior mesenteric artery syndrome by endoscopic ultrasound-guided gastrojejunostomy. Endoscopy. 2021;53(2):204-5.
42. Burrington JD. Superior mesenteric artery syndrome in children. American journal of diseases of children (1960). 1976;130(12):1367-70.
43. Bütter A, Jayaraman S, Schlachta C. Robotic duodenojejunostomy for superior mesenteric artery syndrome in a teenager. Journal of robotic surgery. 2010;4(4):265-9.
44. Cantella R, Evola G, Di Fidio C, Iudica M, Patanè M, Piazza L. An unusual cause of abdominal pain: Case report of a Superior Mesenteric Artery syndrome. International journal of surgery case reports. 2022;94:107034.
45. Cao MM, Dalton D. Superior mesenteric artery syndrome following laparoscopic gastric banding. ANZ journal of surgery. 2012;82(9):655.
46. Capitano S, Donatelli G, Boccoli G. Superior Mesenteric Artery Syndrome-Believe in it! Report of a Case. Case reports in surgery. 2012;2012:282646.
47. Catarino Santos S, Loureiro AR, Simão R, Pereira J, Pinheiro LF, Casimiro C. Wilkie's syndrome: a case report of favourable minimally invasive surgery. Journal of surgical case reports. 2018;2018(2):rjy027.
48. Chan DK, Mak KS, Cheah YL. Successful nutritional therapy for superior mesenteric artery syndrome. Singapore medical journal. 2012;53(11):e233-6.
49. Choi JW, Lee JY, Cho HG. Superior Mesenteric Artery Syndrome Treated with Percutaneous Radiologic Gastrojejunostomy. The Korean journal of gastroenterology = Taehan Sohwagi Hakhoe chi. 2016;67(6):321-6.
50. Chrysikos D, Troupis T, Tsiaoussis J, Sgantzos M, Bonatsos V, Karampelias V, et al. Superior mesenteric artery syndrome: a rare case of upper gastrointestinal obstruction. Journal of surgical case reports. 2019;2019(3):rjz054.
51. Chung A, Smith LI, McMurran A, Ali A. Laparoscopic gastrojejunostomy for superior mesenteric artery syndrome in a patient with Parkinson's disease. Scottish medical journal. 2016;61(1):51-5.
52. Cienfuegos JA, Hurtado-Pardo L, Valentí V, Landecho MF, Vivas I, Estévez MG, et al. Minimally Invasive Surgical Approach for the Treatment of Superior Mesenteric Artery Syndrome: Long-Term Outcomes. World journal of surgery. 2020;44(6):1798-806.
53. Civan HA, Gülcü D, Erkan T, Çokuğraş F, Kutlu T. Wilkie's syndrome admitted for acute abdomen: A case presentation. Turk pediatri arsivi. 2018;53(3):193-6.
54. Clapp B, Applebaum B. Superior mesenteric artery syndrome after Roux-en-y gastric bypass. JSLS : Journal of the Society of Laparoendoscopic Surgeons. 2010;14(1):143-6.
55. Claro M, Sousa D, Abreu da Silva A, Grilo J, Martins JA. Wilkie's Syndrome: An Unexpected Finding. Cureus. 2021;13(12):e20413.
56. Cohen LB, Field SP, Sachar DB. The superior mesenteric artery syndrome. The disease that isn't, or is it? Journal of clinical gastroenterology. 1985;7(2):113-6.
57. Corfield AP, May RE. Vascular compression of the duodenum--operative and non-operative treatment. Bristol medico-chirurgical journal (1963). 1984;99(372):111-2.
58. Cullis PS, Gallagher M, Sabharwal AJ, Hammond P. Minimally invasive surgery for superior mesenteric artery syndrome: a case report and literature review. Scottish medical journal. 2016;61(1):42-7.
59. Danushka PGN, Jayasinghe R, Wijemanne A. Superior mesenteric artery syndrome treatment strategies: A case report. SAGE open medical case reports. 2023;11:2050313x231184587.

60. Dash N. An Unusual Cause of Superior Mesenteric Artery Syndrome in a Young Boy. Medical journal, Armed Forces India. 2011;67(1):92.
61. De Angelis P, Iacobelli BD, Torroni F, Dall'Oglio L, Bagolan P, Fusaro F. What else is hiding behind superior mesenteric artery syndrome? Journal of surgical case reports. 2015;2015(5).
62. Demir MK, Cevher T. A Rare Cause and Complication of Acute Gastric Dilatation: Superior Mesenteric Artery Syndrome and Perforation. The Eurasian journal of medicine. 2018;50(1):60-1.
63. Derincek A, Wood KB, Muench CA. Superior mesenteric artery syndrome following correction of kyphosis in an adult. Journal of spinal disorders & techniques. 2004;17(6):549-53.
64. Desai MH, Gall A, Khoo M. Superior mesenteric artery syndrome - A rare presentation and challenge in spinal cord injury rehabilitation: A case report and literature review. The journal of spinal cord medicine. 2015;38(4):544-7.
65. Deshpande SH, Thomas J, Chiranjeev R, Pandya JS. Superior mesenteric artery syndrome in a patient with celiacomesenteric trunk. BMJ case reports. 2021;14(2).
66. Di Matteo F, Picconi F, Sansoni I, Pandolfi M, Martino M, Rea R, et al. Superior mesenteric artery syndrome diagnosed with linear endoscopic ultrasound. Endoscopy. 2010;42 Suppl 2:E67-8.
67. Diab S, Hayek F. Combined Superior Mesenteric Artery Syndrome and Nutcracker Syndrome in a Young Patient: A Case Report and Review of the Literature. The American journal of case reports. 2020;21:e922619.
68. Dimopoulou A, Zavras N, Alexopoulou E, Fessatou S, Dimopoulou D, Attilakos A. Superior mesenteric artery syndrome mimicking cyclic vomiting syndrome in a healthy 12-year-old boy. Journal of paediatrics and child health. 2020;56(1):168-70.
69. Economides NG, Fortner TM, Dunavant WD. Duodenal diaphragm associated with superior mesenteric artery syndrome. American journal of surgery. 1981;141(2):274-6.
70. Edem S, Goswami AG, Karki B, Acharya P, Chauhan U, Kumar N, et al. Superior Mesenteric Artery Syndrome as a Rare Cause of Postoperative Intractable Vomiting: A Case Report. Clinical and experimental gastroenterology. 2023;16:101-5.
71. Ehlers TO, Tsamalaidze L, Pereira L, Stauffer J. Laparoscopic Duodenojejunostomy for the SMA Syndrome. Zentralblatt fur Chirurgie. 2018;143(5):461-3.
72. England J, Li N. Superior mesenteric artery syndrome: A review of the literature. Journal of the American College of Emergency Physicians open. 2021;2(3):e12454.
73. Esmat HA, Najah DM. Superior mesenteric artery syndrome caused by acute weight loss in a 16-year-old polytrauma patient: A rare case report and review of the literature. Annals of medicine and surgery (2012). 2021;65:102284.
74. Falcone JL, Garrett KO. Superior mesenteric artery syndrome after blunt abdominal trauma: a case report. Vascular and endovascular surgery. 2010;44(5):410-2.
75. Fang JF, Wei B, Zheng ZH, Lei PR, Chen TF, Wei HB. Laparoscopic lysis of the ligament of treitz for superior mesenteric artery syndrome. Digestive surgery. 2014;31(4-5):291-6.
76. Farina R, Foti PV, Cocuzza G, Costanzo V, Costanzo G, Conti A, et al. Wilkie's syndrome. Journal of ultrasound. 2017;20(4):339-42.
77. Farina R, Foti PV, Coronella M, Pennisi I, Libra F, Di Mari A, et al. Superior mesenteric artery syndrome (Wilkie Syndrome) with unusual clinical onset: Description of a rare case. Radiology case reports. 2021;16(10):2998-3002.
78. Feng YM, Wan D, Guo R. Case report of gastric distension due to superior mesenteric artery syndrome mimicking hollow viscus perforation: Considerations in critical care ultrasound. Medicine. 2018;97(20):e10757.
79. Fraser JD, St Peter SD, Hughes JH, Swain JM. Laparoscopic duodenojejunostomy for superior mesenteric artery syndrome. JSLS : Journal of the Society of Laparoendoscopic Surgeons. 2009;13(2):254-9.

80. Frongia G, Schenk JP, Schaible A, Sauer P, Mehrabi A, Günther P. Food fear, quick satiety and vomiting in a 16 years old girl: It's bulimia, or maybe not…? A case report of Wilkie's syndrome (superior mesenteric artery syndrome). International journal of surgery case reports. 2019;65:184-8.
81. Fuhrman MA, Felig DM, Tanchel ME. Superior mesenteric artery syndrome with obstructing duodenal bezoar. Gastrointestinal endoscopy. 2003;57(3):387.
82. Furuya Y, Wakahara T, Furuya A, Yanagie H, Yasuhara H. Rare bowel emphysema with superior mesenteric artery syndrome after surgery. Annals of the Royal College of Surgeons of England. 2020;102(2):e26-e8.
83. Galarza-Delgado D, Flores-Alvarado DE, Compeán-Villegas JE. Superior mesenteric artery syndrome in a patient with rheumatoid arthritis and rheumatoid cachexia during the COVID-19 pandemic. Clinical rheumatology. 2021;40(5):2095-6.
84. Genser L, Tresallet C, Zarzavadjian Le Bian A. Superior Mesenteric Artery Syndrome Aggravating Severe Malnutrition. Journal of gastrointestinal surgery : official journal of the Society for Surgery of the Alimentary Tract. 2020;24(8):1889-90.
85. Gersin KS, Heniford BT. Laparoscopic duodenojejunostomy for treatment of superior mesenteric artery syndrome. JSLS : Journal of the Society of Laparoendoscopic Surgeons. 1998;2(3):281-4.
86. Ghaedi E, Kianifar H, Imani B, Imani B. Superior mesenteric artery syndrome in a child with acute gastric dilatation with refractory Guillain-Barré syndrome. Clinical nutrition ESPEN. 2019;32:40-3.
87. Goes RN, Coy CS, Amaral CA, Fagundes JJ, Medeiros RR. Superior mesenteric artery syndrome as a complication of ileal pouch-anal anastomosis. Report of a case. Diseases of the colon and rectum. 1995;38(5):543-4.
88. Goitein D, Gagné DJ, Papasavas PK, Dallal R, Quebbemann B, Eichinger JK, et al. Superior mesenteric artery syndrome after laparoscopic Roux-en-Y gastric bypass for morbid obesity. Obesity surgery. 2004;14(7):1008-11.
89. Goto S, Ookawara S, Sugai M. Superior mesenteric artery syndrome due to duodenal edema in a chronic renal failure patient: a case report. CEN case reports. 2014;3(1):14-7.
90. Guanà R, Garofalo S, Scottoni F, Di Rosa G, Gennari F. Pediatric Wilkie's syndrome: Report of two monozygotic sisters managed conservatively. Pediatrics and neonatology. 2021;62(2):227-8.
91. Gupta H, Agrawal A, Pathak AA. Superior Mesenteric Artery Syndrome Following Tubercular Intestinal Perforation. Cureus. 2019;11(4):e4506.
92. Gustafsson L, Falk A, Lukes PJ, Gamklou R. Diagnosis and treatment of superior mesenteric artery syndrome. The British journal of surgery. 1984;71(7):499-501.
93. Gutkin E, Hussain SA, Kim SH. Changing angles: successful treatment of superior mesenteric artery syndrome with double-balloon enteroscopy-assisted direct feeding jejunostomy. Digestive endoscopy : official journal of the Japan Gastroenterological Endoscopy Society. 2012;24(6):482.
94. Haidar A, Davies A, Hussain A, Gregerson S, Thammineni D, Markus J. Wilkie's Weight Loss Wonder, A Case Series. Spartan medical research journal. 2020;5(2):13485.
95. Hamidi H, Tareq Rahimi M, Maroof S, Ahrar Soroush F. Computed tomography features and surgical treatment of superior mesenteric artery syndrome: A case report. Radiology case reports. 2019;14(12):1529-32.
96. Hasegawa N, Oka A, Awoniyi M, Yoshida Y, Tobita H, Ishimura N, et al. Dynamic ultrasonography for optimizing treatment position in superior mesenteric artery syndrome: Two case reports and review of literature. World journal of gastroenterology. 2024;30(5):499-508.
97. Hashimoto H, Seno A, Ishizaki A, Terasaki S, Kimoto T. Superior mesenteric artery syndrome resulting from acute massive gastric dilatation caused by Helicobacter pylori-induced acute antral gastritis. Clinical journal of gastroenterology. 2008;1(4):153-6.

98. Heidbreder R. Co-occurring superior mesenteric artery syndrome and nutcracker syndrome requiring Roux-en-Y duodenojejunostomy and left renal vein transposition: a case report and review of the literature. Journal of medical case reports. 2018;12(1):214.
99. Hideya I, Abe Y, Endo T. Massive Gastric Dilatation and Multi-Organ Ischemia Due to Superior Mesenteric Artery Syndrome: A Rare Case Report. The American journal of case reports. 2023;24:e940910.
100. Hillyard J, Solomon S, Kaspar M, Chow E, Smallfield G. Gastrointestinal: Reversal of superior mesenteric artery syndrome following pregnancy. Journal of gastroenterology and hepatology. 2019;34(3):486.
101. Hines JR, Gore RM, Ballantyne GH. Superior mesenteric artery syndrome. Diagnostic criteria and therapeutic approaches. American journal of surgery. 1984;148(5):630-2.
102. Hod-Feins R, Copeliovitch L, Abu-Kishk I, Eshel G, Lotan G, Shalmon E, et al. Superior mesenteric artery syndrome after scoliosis repair surgery: a case study and reassessment of the syndrome's pathogenesis. Journal of pediatric orthopedics Part B. 2007;16(5):345-9.
103. Hoffman RJ, Arpadi SM. A pediatric AIDS patient with superior mesenteric artery syndrome. AIDS patient care and STDs. 2000;14(1):3-6.
104. Holinger C, Sejka M, Skidmore A. Case report: doing the mesenteric twist. Journal of surgical case reports. 2023;2023(8):rjad221.
105. Ihoriya H, Yumoto T, Iwamuro M, Fujisaki N, Osako T, Naito H, et al. Gastric Emphysema in a Critically Ill Patient Successfully Treated without Surgery. Case reports in critical care. 2019;2019:1824101.
106. Iko BO, Monu JU, Orhue A, Sarkar SK. The superior mesenteric artery syndrome in pregnancy: a case resulting in recurrent pregnancy loss. European journal of obstetrics, gynecology, and reproductive biology. 1986;21(4):233-6.
107. Iwaoka Y, Yamada M, Takehira Y, Hanajima K, Nakamura T, Murohisa G, et al. Superior mesenteric artery syndrome in identical twin brothers. Internal medicine (Tokyo, Japan). 2001;40(8):713-5.
108. Jain A, Husain J, Rehan M. Vascular compression of Duodenum: A case report of superior mesenteric artery syndrome. Medical journal, Armed Forces India. 2022;78(Suppl 1):S285-s8.
109. Jain V, Singal AK, Ramu C, Raghunaathan KD. Superior mesenteric artery syndrome: a rare complication in a child with Marfan syndrome. Archives of disease in childhood. 2013;98(10):754-5.
110. Jalilvand A, Fisichella PM. Superior mesenteric artery syndrome. Digestive and liver disease : official journal of the Italian Society of Gastroenterology and the Italian Association for the Study of the Liver. 2014;46(9):859.
111. Jani PG. Superior mesenteric artery syndrome: case report. East African medical journal. 2003;80(6):334-6.
112. Javaid A, Siraj QH. The Clinical Value of Serial Radionuclide Gastric-Emptying Scintigraphy for Objective Evaluation of Gastroparesis in a Patient with Superior Mesenteric Artery Syndrome Post Corrective Surgery. World journal of nuclear medicine. 2022;21(2):156-60.
113. Jin S, Zhou H, Li W. Nursing of a lactating patient with superior mesenteric artery syndrome: a case report. The Journal of international medical research. 2023;51(3):3000605231157198.
114. Jo JB, Song KY, Park CH. Laparoscopic duodenojejunostomy for superior mesenteric artery syndrome: report of a case. Surgical laparoscopy, endoscopy & percutaneous techniques. 2008;18(2):213-5.
115. Johnson BM, Paladugu G. Superior Mesenteric Artery Syndrome Secondary to Anorexia Nervosa and Methamphetamine Use. Cureus. 2019;11(11):e6121.
116. Kabashi-Muqaj S, Kotori V, Lascu LC, Bondari S, Ahmetgjekaj I. The Role of MSCT in Superior Mesenteric Artery Syndrome (SMAS). Current health sciences journal. 2016;42(3):298-300.

117. Karki B, Pun B, Shrestha A, Shrestha PS. Superior mesenteric artery syndrome. Clinical case reports. 2020;8(11):2295-7.
118. Kaur A, Pawar NC, Singla S, Mohi JK, Sharma S. Superior Mesentric Artery Syndrome in a Patient with Subacute Intestinal Obstruction: A Case Report. Journal of clinical and diagnostic research : JCDR. 2016;10(6):Td03-5.
119. Kawabata H, Sone D, Yamaguchi K, Inoue N, Okazaki Y, Ueda Y, et al. Endoscopic Gastrojejunostomy for Superior Mesenteric Artery Syndrome Using Magnetic Compression Anastomosis. Gastroenterology research. 2019;12(6):320-3.
120. Kawanishi K, Shojima K, Nishimoto M, Abe H, Kakimoto T, Yasuda Y, et al. Superior Mesenteric Artery Syndrome May Be Overlooked in Women with Functional Dyspepsia. Internal medicine (Tokyo, Japan). 2017;56(19):2549-54.
121. Kayawake H, Chen-Yoshikawa TF, Aoyama A, Zhang J, Date H. Superior mesenteric artery syndrome after lung transplantation: a rare early gastrointestinal complication of lung transplantation. Surgery today. 2017;47(11):1415-8.
122. Khanal B, Panthi S, Bhattarai R, Khatiwada P, Acharya R, Neupane D, et al. Superior mesenteric artery syndrome mimicking gastric outlet obstruction: a case report and a literature review. Annals of medicine and surgery (2012). 2023;85(4):939-42.
123. Khodear Y, Al-Ramli W, Bodnar Z. Laparoscopic management of a complicated case of Wilkie's syndrome: A case report. International journal of surgery case reports. 2017;37:177-9.
124. Kim HR, Park MW, Lee SS, Shin MJ, Park JH, Yang CW, et al. Superior mesenteric artery syndrome due to an aortic aneurysm in a renal transplant recipient. Journal of Korean medical science. 2002;17(4):552-4.
125. Kim IY, Cho NC, Kim DS, Rhoe BS. Laparoscopic duodenojejunostomy for management of superior mesenteric artery syndrome: two cases report and a review of the literature. Yonsei medical journal. 2003;44(3):526-9.
126. Kim J, Yang S, Im YC, Park I. Superior mesenteric artery syndrome treated successfully by endoscopy-assisted jejunal feeding tube placement. BMJ case reports. 2021;14(11).
127. Kimura A, Morinaga N, Wada W, Ogata K, Morishita A, Okuyama T, et al. Laparoscopic gastrojejunostomy with laparoscopic-assisted percutaneous endoscopic gastrostomy for superior mesenteric artery syndrome with dysphagia: a case report. Surgical case reports. 2022;8(1):163.
128. Kirby GC, Faulconer ER, Robinson SJ, Perry A, Downing R. Superior mesenteric artery syndrome: a single centre experience of laparoscopic duodenojejunostomy as the operation of choice. Annals of the Royal College of Surgeons of England. 2017;99(6):472-5.
129. Kitade H, Matsuura T, Yanagida H, Yamada M, Nakai K, Tokuhara K, et al. Superior mesenteric artery syndrome after ileal pouch-anal anastomosis for colon cancer associated with ulcerative colitis: report of a case. Surgical case reports. 2015;1(1):27.
130. Kogawa K, Kusama Y. Superior mesenteric artery syndrome in a healthy adolescent. BMJ case reports. 2017;2017.
131. Komai H, Naito Y, Fujiwara K. Superior mesenteric artery syndrome as a result of enlarged abdominal aortic aneurysm. Journal of vascular surgery. 1999;29(6):1162-3.
132. Konstantinidis H, Charisis C, Kottos P. Robotic Strong's procedure for the treatment of superior mesenteric artery syndrome. Description of surgical technique on occasion of the first reported case in the literature. The international journal of medical robotics + computer assisted surgery : MRCAS. 2018;14(1).
133. Kornmehl P, Weizman Z, Liss Z, Bar-Ziv J, Joseph A. Superior mesenteric artery syndrome presenting as an anorexia nervosa-like illness. Journal of adolescent health care : official publication of the Society for Adolescent Medicine. 1988;9(4):340-3.

134. Kubo T, Adachi Y, Kikuchi T, Mita H, Endo T. Percutaneous endoscopic gastrojejunostomy for treating superior mesenteric artery syndrome. Gastrointestinal endoscopy. 2019;90(6):983-4.
135. Kulkarni S. Chronic pancreatitis presenting as superior mesenteric artery syndrome. BMJ case reports. 2015;2015.
136. Kurisu K, Yamanaka Y, Yamazaki T, Yoneda R, Otani M, Takimoto Y, et al. A clinical course of a patient with anorexia nervosa receiving surgery for superior mesenteric artery syndrome. Journal of eating disorders. 2021;9(1):79.
137. Kwon OY, Lim SG, Park SH. Mitochondrial encephalomyopathy, lactic acidosis, and stroke-like episode leading to recurrent superior mesenteric artery syndrome. The American journal of emergency medicine. 2014;32(8):951.e1-2.
138. Laffont I, Bensmail D, Rech C, Prigent G, Loubert G, Dizien O. Late superior mesenteric artery syndrome in paraplegia: case report and review. Spinal cord. 2002;40(2):88-91.
139. Lai YK, Mahmood RD. Clinics in diagnostic imaging (168). Singapore medical journal. 2016;57(5):274-8.
140. Lao BB, Pitts AM, Thomas A, Camacho SM. Superior Mesenteric Artery Syndrome and Nutcracker Syndrome as the Presentation of Crohn's Disease in a Young Patient: A Case Report and Review of Literature. JPGN reports. 2023;4(4):e357.
141. Li J, Chousleb E, Hidalgo J, Patel S, Szomstein S, Rosenthal RJ. Laparoscopic Roux-en-Y duodenojejunal bypass for superior mesenteric artery syndrome: case reports and review of the literature. Surgical laparoscopy, endoscopy & percutaneous techniques. 2011;21(6):e344-7.
142. Li X, Tian M, Yang H, Liu Y, Chen J, Tian H. Superior mesenteric artery syndrome after colectomy: A case report and literature review. Medicine. 2022;101(35):e30427.
143. Li Y, Luo Y, Fu G, Ge M, Tie H. Superior mesenteric artery syndrome following lung cancer surgery: A case report. International journal of surgery case reports. 2023;105:108036.
144. Lippl F, Hannig C, Weiss W, Allescher HD, Classen M, Kurjak M. Superior mesenteric artery syndrome: diagnosis and treatment from the gastroenterologist's view. Journal of gastroenterology. 2002;37(8):640-3.
145. Loeb T, Loubert G, Morsly R, Gabillet JM, Pasteyer J. [Superior mesenteric artery syndrome]. Annales francaises d'anesthesie et de reanimation. 1999;18(9):1000-4.
146. Long FR, Mutabagani KH, Caniano DA, Dumont RC. Duodenum inversum mimicking mesenteric artery syndrome. Pediatric radiology. 1999;29(8):602-4.
147. Lorentziadis ML. Wilke's syndrome. A rare cause of duodenal obstruction. Annals of gastroenterology. 2011;24(1):59-61.
148. Luccas GC, Lobato AC, Menezes FH. Superior mesenteric artery syndrome: an uncommon complication of abdominal aortic aneurysm repair. Annals of vascular surgery. 2004;18(2):250-3.
149. Lui A, Mempin MV. Superior Mesenteric Artery Syndrome: An Uncommon Cause of Abdominal Pain. The Journal of emergency medicine. 2018;54(4):e83-e5.
150. Lukes PJ, Rolny P, Nilson AE, Gamklou R, Darle N, Dotevall G. Diagnostic value of hypotonic duodenography in superior mesenteric artery syndrome. Acta chirurgica Scandinavica. 1978;144(1):39-43.
151. Lundell L, Thulin A. Wilkie's syndrome--a rarity? The British journal of surgery. 1980;67(8):604-6.
152. Lurie A, Guntupalli L, Stoll V, Moon A. Superior Mesenteric Artery Syndrome Masquerading As Irritable Bowel Syndrome: A Case Report. Cureus. 2023;15(8):e43623.
153. Magee GA, Slater BJ, Lee JT, Poultsides GA. Correction to: Laparoscopic Duodenojejunostomy for Superior Mesenteric Artery Syndrome. Digestive diseases and sciences. 2021;66(3):928.
154. Maharajan K, Thambiah JS. Unusual delayed presentation of superior mesenteric artery syndrome following scoliosis correction surgery-a case report and review of literature. Journal of spine surgery (Hong Kong). 2017;3(2):272-7.

155. Makam R, Chamany T, Potluri VK, Varadaraju PJ, Murthy R. Laparoscopic management of superior mesentric artery syndrome: A case report and review of literature. Journal of minimal access surgery. 2008;4(3):80-2.
156. Makary MS, Rajan A, Aquino AM, Chamarthi SK. Clinical and Radiologic Considerations for Idiopathic Superior Mesenteric Artery Syndrome. Cureus. 2017;9(11):e1822.
157. Martins AR, Cunha JF, Patrício J, Caravana J. Familial superior mesenteric artery syndrome. BMJ case reports. 2016;2016.
158. Matheos E, Vasileios K, Ioannis B, Dimitrios Z, Kostas H. Superior Mesenteric Artery Syndrome. Case reports in gastroenterology. 2009;3(2):156-61.
159. Matheus Cde O, Waisberg J, Zewer MH, Godoy AC. Syndrome of duodenal compression by the superior mesenteric artery following restorative proctocolectomy: a case report and review of literature. Sao Paulo medical journal = Revista paulista de medicina. 2005;123(3):151-3.
160. McKinnon DA, Spencer JR. SUPERIOR MESENTERIC ARTERY SYNDROME. American journal of surgery. 1963;106:552-7.
161. Mearelli F, Degrassi F, Occhipinti AA, Casarsa C, De Manzini N, Biolo G. Pinched: superior mesenteric artery syndrome. The American journal of medicine. 2014;127(5):393-4.
162. Merrett ND, Wilson RB, Cosman P, Biankin AV. Superior mesenteric artery syndrome: diagnosis and treatment strategies. Journal of gastrointestinal surgery : official journal of the Society for Surgery of the Alimentary Tract. 2009;13(2):287-92.
163. Miyadera K, Nakamichi S, Miyashita R, Shimizu M, Noro R, Kubota K, et al. Two cases of superior mesenteric artery syndrome during chemotherapy in patients with lung cancer. International cancer conference journal. 2022;11(2):124-8.
164. Mohtashami A, Chui JN, Law C, Cole-Clark D, Simon R. Postoperative superior mesenteric artery syndrome following appendicectomy: A case report. International journal of surgery case reports. 2022;90:106629.
165. Molina Proaño GA, Cobo Andrade MM, Guadalupe Rodríguez RA, Gálvez Salazar PF, Cadena Aguirre DP, González Poma GV, et al. Wilkie's syndrome, a missed opportunity. Journal of surgical case reports. 2018;2018(9):rjy246.
166. Mosalli R, El-Bizre B, Farooqui M, Paes B. Superior mesenteric artery syndrome: a rare cause of complete intestinal obstruction in neonates. Journal of pediatric surgery. 2011;46(12):e29-31.
167. Moskovich R, Cheong-Leen P. Vascular compression of the duodenum. Journal of the Royal Society of Medicine. 1986;79(8):465-7.
168. Moyer K, Thompson GH, Poe-Kochert C, Splawski J. Superior Mesenteric Artery Syndrome Complicated by Gastric Mucosal Necrosis Following Congenital Scoliosis Surgery: A Case Report. JBJS case connector. 2019;9(3):e0380.
169. Murakami T, Matsui Y. Laparoscopic duodenojejunostomy for malignant stenosis as a part of multimodal therapy: A case report. World journal of clinical cases. 2022;10(16):5324-30.
170. Murthi GV, Raine PA. Superior mesenteric artery syndrome in children. Scottish medical journal. 2001;46(5):153-4.
171. N S, Jhanwar A, Singh N. Superior Mesenteric Artery (SMA) Syndrome With Enterocutaneous Fistula in a Young Woman: A Rare Association. Cureus. 2023;15(5):e39696.
172. Naseem Z, Premaratne G, Hendahewa R. "Less is more": Non operative management of short term superior mesenteric artery syndrome. Annals of medicine and surgery (2012). 2015;4(4):428-30.
173. Neuman A, Desai B, Glass D, Diab W. Superior mesenteric artery syndrome in a patient with cerebral palsy. Case reports in medicine. 2014;2014:538289.
174. Nishiguchi S, Shirobe T. Acute abdominal pain caused by superior mesenteric artery syndrome in a healthy young boy. BMJ case reports. 2016;2016.

175. Nunn R, Henry J, Slesser AA, Fernando R, Behar N. A Model Example: Coexisting Superior Mesenteric Artery Syndrome and the Nutcracker Phenomenon. Case reports in surgery. 2015;2015:649469.
176. Nyenhuis RA, Moran-Bano C. When You Hear Hoofbeats, Think of Zebras: An Autobiographical Case Report of Superior Mesenteric Artery Syndrome. Cureus. 2022;14(2):e22519.
177. Oguz A, Uslukaya O, Ülger BV, Turkoglu A, Bahadır MV, Bozdag Z, et al. Superior mesenteric artery (Wilkie's) syndrome: a rare cause of upper gastrointestinal system obstruction. Acta chirurgica Belgica. 2016;116(2):81-8.
178. Oh MJ. Superior Mesenteric Artery Syndrome Combined with Renal Nutcracker Syndrome in a Young Male: A Case Report. The Korean journal of gastroenterology = Taehan Sohwagi Hakhoe chi. 2017;70(5):253-60.
179. Ojemolon PE, Maghari I, Almoghrabi A. Diurnal Fasting During Ramadan Leading to Superior Mesenteric Artery Syndrome. ACG case reports journal. 2022;9(10):e00901.
180. Oliva-Fonte C, Fernández Rey C, Pereda Rodríguez J, González-Fernández AM. Wilkie´s syndrome. Revista espanola de enfermedades digestivas. 2017;109(1):62-3.
181. Oliveira CA, Barbosa L, Dionísio T. Superior mesenteric artery syndrome in a young woman. BMJ case reports. 2017;2017.
182. Ooi GC, Chan KL, Ko KF, Peh WC. Computed tomography of the superior mesenteric artery syndrome. Clinical imaging. 1997;21(3):210-2.
183. P AS, Ramdev P, Chauhan V, Chandrashekar Rao V. Superior Mesenteric Artery Syndrome - A Rare Complication Following Left Radical Nephrectomy and IVC Thrombectomy. Urology. 2020;136:e37-e41.
184. Pacheco TBS, Chacon ACM, Brite J, Sohail AH, Gangwani MK, Malgor RD, et al. Nutcracker phenomenon secondary to superior mesenteric artery syndrome. Journal of surgical case reports. 2023;2023(1):rjac622.
185. Padhan P, Moses V, Moses V, Danda D. Superior mesenteric artery syndrome in an adult rheumatoid arthritis patient. International journal of rheumatic diseases. 2012;15(1):e4-5.
186. Palanivelu C, Rangarajan M, Senthilkumar R, Parthasarathi R, Jani K. Laparoscopic duodenojejunostomy for superior mesenteric artery syndrome. JSLS : Journal of the Society of Laparoendoscopic Surgeons. 2006;10(4):531-4.
187. Parashar K, Gandhi D, Nepal P, Sapire J, Ahuja K, Siddiqui I. Abdominal aortic aneurysm and its association with duodenal obstruction: aortoduodenal syndrome. BJR case reports. 2020;6(4):20200040.
188. Park JH, Lee SH, Park DH, Park JY, Park SH, Chung IK, et al. Superior mesenteric artery syndrome (with video). Gastrointestinal endoscopy. 2008;67(2):348-50.
189. Pastor Peinado P, Priego Jiménez P, Ocaña Jiménez J. Laparoscopic duodenojejunostomy as a treatment for Wilkie's syndrome. Analysis of a four cases series. Revista espanola de enfermedades digestivas. 2019;111(12):974-5.
190. Pedoto MJ, O'Dell MW, Thrun M, Hollifield D. Superior mesenteric artery syndrome in traumatic brain injury: two cases. Archives of physical medicine and rehabilitation. 1995;76(9):871-5.
191. Pillay Y. Superior Mesenteric Artery Syndrome: A Case Report of Two Surgical Options, Duodenal Derotation and Duodenojejunostomy. Case reports in vascular medicine. 2016;2016:8301025.
192. Pottorf BJ, Husain FA, Hollis HW, Jr., Lin E. Laparoscopic management of duodenal obstruction resulting from superior mesenteric artery syndrome. JAMA surgery. 2014;149(12):1319-22.
193. Rabie ME, Ogunbiyi O, Al Qahtani AS, Taha SB, El Hadad A, El Hakeem I. Superior Mesenteric Artery Syndrome: Clinical and Radiological Considerations. Surgery research and practice. 2015;2015:628705.
194. Raff L, Cole E, Phillips L, Raff E. Food Insecurity Leading to Superior Mesenteric Artery Syndrome Managed Successfully with Endoscopic Gastrojejunostomy Stent. The American journal of case reports. 2023;24:e939420.

195. Raissi B, Taylor BM, Taves DH. Recurrent superior mesenteric artery (Wilkie's) syndrome: a case report. Canadian journal of surgery Journal canadien de chirurgie. 1996;39(5):410-6.
196. Ren PLJ, Gupta A. Adolescent with Superior Mesenteric Artery Syndrome. Journal of radiology case reports. 2020;14(3):14-23.
197. Requena-López AA, Mata-Samperio BK, Cuadra-Reyes LA, Casillas-Vargas R. Wilkie's syndrome as a cause of bowel obstruction in adults: A case report. Cirugia y cirujanos. 2020;88(2):185-8.
198. Ricca RL, Kasten J, Javid PJ. Superior mesenteric artery syndrome after minimally invasive correction of pectus excavatum: impact of post-operative weight loss. Journal of pediatric surgery. 2012;47(11):2137-9.
199. Richardson WS, Surowiec WJ. Laparoscopic repair of superior mesenteric artery syndrome. American journal of surgery. 2001;181(4):377-8.
200. Riera DC, Phalen JA. Superior mesenteric artery syndrome in a patient with autism spectrum disorder: case report and review of the literature. Journal of autism and developmental disorders. 2013;43(1):244-6.
201. Rod J, Sarnacki S, Petit T, Ravasse P. Portal venous gas and thrombosis complicating superior mesenteric artery syndrome (Wilkie's syndrome) in a child. Journal of pediatric surgery. 2010;45(4):826-9.
202. Rodríguez-Quintero JH, Santes O, Morales-Maza J. Mesenteric artery syndrome associated with HAART onset in a patient with HIV. BMJ case reports. 2018;2018.
203. Roth EJ, Fenton LL, Gaebler-Spira DJ, Frost FS, Yarkony GM. Superior mesenteric artery syndrome in acute traumatic quadriplegia: case reports and literature review. Archives of physical medicine and rehabilitation. 1991;72(6):417-20.
204. Roy A, Gisel JJ, Roy V, Bouras EP. Superior mesenteric artery (Wilkie's) syndrome as a result of cardiac cachexia. Journal of general internal medicine. 2005;20(10):C3-4.
205. Russell EA, Braverman RM, Vasudevan SA, Patel B. A Traumatic Quinceañera: Acute Superior Mesenteric Artery Syndrome in an Adolescent Girl. Pediatric emergency care. 2021;37(4):e203-e5.
206. Sabbagh C, Santin E, Potier A, Regimbeau JM. The superior mesenteric artery syndrome: a rare etiology for proximal obstructive syndrome. Journal of visceral surgery. 2012;149(6):428-9.
207. Sabry A, Shaalan R, Kahlin C, Elhoofy A. Superior Mesenteric Artery Syndrome Managed with Laparoscopic Duodenojejunostomy. Minimally invasive surgery. 2022;2022:4607440.
208. Sahni S, Shiralkar M, Mohamed S, Carroll R, Jung B, Gaba R, et al. Superior Mesenteric Artery Syndrome: The Dark Side of Weight Loss. Cureus. 2017;9(11):e1859.
209. Satish Kumar L, Kaundinya KB. A rare instance of Wilkie's syndrome in a young male during the holy month of Ramadan. International journal of surgery case reports. 2021;80:105652.
210. Sato M, Hattori K, Miyauchi Y. Laparoscopic Roux-en-Y duodenojejunostomy for superior mesenteric artery syndrome in a 6-year-old girl: A case report of a new minimally surgical technique for children. Asian journal of endoscopic surgery. 2014;7(4):334-6.
211. Schroeppel TJ, Chilcote WS, Lara MD, Kothari SN. Superior mesenteric artery syndrome after laparoscopic Roux-en-Y gastric bypass. Surgery. 2005;137(3):383-5.
212. Schwarz J, Sýkora J, Pomahačová R, Sýkorová A, Fremuth J, Šašek L, et al. Rare cause of upper bowel obstruction arising in a 17-year-old boy with cystic fibrosis: Superior mesenteric artery (Wilkie's) syndrome. Journal of paediatrics and child health. 2020;56(11):1827-9.
213. Sebesta P, Pirk J, Filipova H. Superior mesenteric artery syndrome following abdominal aortic aneurysm resection and replacement. The Thoracic and cardiovascular surgeon. 1987;35(6):378-81.
214. Seo JH, Lee I, Choi S, Yang S, Kim YJ. Gastric Pneumatosis and Its Gastrofibroscopic Findings in Life-Threatening Superior Mesenteric Artery Syndrome Complicated by Anorexia Nervosa in a Child. Pediatric gastroenterology, hepatology & nutrition. 2023;26(5):284-9.

215. Shandling B. The so-called superior mesenteric artery syndrome. American journal of diseases of children (1960). 1976;130(12):1371-3.
216. Shinji S, Matsumoto S, Kan H, Fujita I, Kanazawa Y, Yamada T, et al. Superior mesenteric artery syndrome treated with single-incision laparoscopy-assisted duodenojejunostomy. Asian journal of endoscopic surgery. 2015;8(1):67-70.
217. Shiyanagi S, Kaneyama K, Okazaki T, Lane GJ, Yamataka A. Anterior transposition of the third part of the duodenum for the treatment of superior mesenteric artery syndrome. Journal of pediatric surgery. 2008;43(2):e1-3.
218. Sinagra E, Raimondo D, Albano D, Guarnotta V, Blasco M, Testai S, et al. Superior Mesenteric Artery Syndrome: Clinical, Endoscopic, and Radiological Findings. Gastroenterology research and practice. 2018;2018:1937416.
219. Singaporewalla RM, Lomato D, Ti TK. Laparoscopic duodenojejunostomy for superior mesenteric artery syndrome. JSLS : Journal of the Society of Laparoendoscopic Surgeons. 2009;13(3):450-4.
220. Singla AA, Singla AA. Seatbelt syndrome with superior mesenteric artery syndrome: leave nothing to chance! Journal of surgical case reports. 2015;2015(11).
221. Smith JS, Jr., Cooney RN. Superior mesenteric artery syndrome in a tube-fed patient. Nutrition in clinical practice : official publication of the American Society for Parenteral and Enteral Nutrition. 1994;9(4):151-3.
222. Sobani ZA, Rustagi T. Endoscopic Ultrasound-Guided Gastrojejunostomy for the Management of Superior Mesenteric Artery Syndrome. The American journal of gastroenterology. 2020;115(4):634-5.
223. Sours JA, Vorhaus LJ. Superior mesenteric artery syndrome in anorexia nervosa: a case report. The American journal of psychiatry. 1981;138(4):519-20.
224. Sözübir S, Kahraman H, Arslan A, Ekingen G, Güvenç BH. Incomplete duodenal obstruction in a newborn. Indian journal of pediatrics. 2006;73(4):364-6.
225. Spinnato P, Aparisi Gómez MP, Giugliano A, Mercatelli D, Bazzocchi A. Superior mesenteric artery syndrome after scoliosis surgery. Pediatrics international : official journal of the Japan Pediatric Society. 2019;61(11):1181-2.
226. Stheneur C, Rey C, Pariente D, Alvin P. [Acute gastric dilatation with superior mesenteric artery syndrome in a young girl with anorexia nervosa]. Archives de pediatrie : organe officiel de la Societe francaise de pediatrie. 1995;2(10):973-6.
227. Storm AC, Mahmoud T, Akiki K, Law RJ. Endoscopic Ultrasound-Guided Gastrojejunostomy for Superior Mesenteric Artery Syndrome Secondary to Rapid Weight Loss. ACG case reports journal. 2022;9(10):e00868.
228. Su MC, Lee CH, Wang CC. Education and Imaging. Gastrointestinal: Superior mesenteric artery syndrome initially presenting like reflux esophagitis. Journal of gastroenterology and hepatology. 2010;25(3):645.
229. Takahata M, Ito M, Abumi K, Kotani Y, Sudo H, Ohshima S, et al. Comparison of novel ultra-high molecular weight polyethylene tape versus conventional metal wire for sublaminar segmental fixation in the treatment of adolescent idiopathic scoliosis. Journal of spinal disorders & techniques. 2007;20(6):449-55.
230. Tatar G, Coşkun T, Simşek H. Superior mesenteric artery syndrome. A case report. The Turkish journal of pediatrics. 1996;38(3):367-70.
231. Tewari S, Sharma RD, Bangar A, Redkar R. Unusual presentation of superior mesenteric artery syndrome in a child. BMJ case reports. 2022;15(3).
232. Tiwari AK, Bierhals A, Wang JS. An uncommon cause of post-prandial nausea and vomiting. Superior mesenteric artery syndrome. Gastroenterology. 2013;145(3):520, 698.

233. Tseng CK, Su WB, Lai HC, Chou JW, Feng CL, Peng CY, et al. Superior mesenteric artery syndrome caused by celiac axis compression syndrome: a case report and review of the literature. European journal of gastroenterology & hepatology. 2008;20(6):578-82.
234. Tsirikos AI, Anakwe RE, Baker AD. Late presentation of superior mesenteric artery syndrome following scoliosis surgery: a case report. Journal of medical case reports. 2008;2:9.
235. Ugras M, Bicer S, Coskun FT, Romano E, Ekci B. Superior mesenteric artery syndrome: A rare but life threatening disease. Turkish journal of emergency medicine. 2017;17(2):70-2.
236. Umemura A, Nitta H, Katagiri H, Kanno S, Takeda D, Nagase H, et al. Single-Port Laparoscopic Duodenojejunostomy Employing Semi-Kocherization for a Young Female with Superior Mesenteric Artery Syndrome. Case reports in gastroenterology. 2022;16(1):171-8.
237. Vaiciunaite D, Sarici IS, Eriksson SE, Ayazi S, Jobe BA. Acute superior mesenteric artery syndrome with complete foregut obstruction following Nissen fundoplication. International journal of surgery case reports. 2023;104:107958.
238. Valdes A, Cárdenas O, Espinosa A, Villazón O, Valdes V. Superior mesenteric artery syndrome. Journal of the American College of Surgeons. 2005;201(5):808.
239. Valiathan G, Wani M, Lanker J, Reddy PK. A Case Series on Superior Mesenteric Artery Syndrome Surgical Management, Single Institution Experience. Journal of clinical and diagnostic research : JCDR. 2017;11(8):Pr01-pr3.
240. van Rensburg AJ, Ghadiri M. A case report of superior mesenteric artery syndrome. Journal of surgical case reports. 2022;2022(1):rjab630.
241. Veysi VT, Humphrey G, Stringer MD. Superior mesenteric artery syndrome presenting with acute massive gastric dilatation. Journal of pediatric surgery. 1997;32(12):1801-3.
242. Vulliamy P, Hariharan V, Gutmann J, Mukherjee D. Superior mesenteric artery syndrome and the 'nutcracker phenomenon'. BMJ case reports. 2013;2013.
243. Walsh TN, McPhillips M, O'Higgins N. Extrinsic compression of the duodenum -- Wilkies syndrome. Irish journal of medical science. 1983;152(3):129-33.
244. Wang HK, Huang WH, Chen KT. An extensive posterior circulation infarction secondary to primary hyperthyroidism accompanied with superior mesenteric artery syndrome: A case report and description of patho-physiological association. Medicine. 2020;99(46):e22664.
245. Wang T, Wang ZX, Wang HJ. Clinical Insights into Superior Mesenteric Artery Syndrome with Multiple Diseases: A Case Report. Digestive diseases and sciences. 2019;64(6):1711-4.
246. Wang X, Li JZ, Yang YH, Huang XL, Wang Y, Wu B. Intestinal atresia following chemotherapy, presenting as superior mesenteric artery syndrome: A case report. Molecular and clinical oncology. 2017;7(4):543-6.
247. Wang YH, Takada T. Superior mesenteric artery syndrome:--report of four cases. Gastroenterologia Japonica. 1984;19(5):479-85.
248. Wasef K, Hudnall A, Schmidt CR, Marsh JW, Boone BA. Robotic modified Strong procedure for superior mesenteric artery syndrome. Clinical case reports. 2023;11(7):e7651.
249. Watters A, Gibson D, Dee E, Mascolo M, Mehler PS. Superior mesenteric artery syndrome in severe anorexia nervosa: A case series. Clinical case reports. 2020;8(1):185-9.
250. Wilkinson R, Huang CT. Superior mesenteric artery syndrome in traumatic paraplegia: a case report and literature review. Archives of physical medicine and rehabilitation. 2000;81(7):991-4.
251. Wyten R, Kelty CJ, Falk GL. Laparoscopic duodenojejunostomy for the treatment of superior mesenteric artery (SMA) Syndrome: case series. Journal of laparoendoscopic & advanced surgical techniques Part A. 2010;20(2):173-6.
252. Xu MM, Dawod E, Gaidhane M, Tyberg A, Kahaleh M. Reverse Endoscopic Ultrasound-Guided Gastrojejunostomy for the Treatment of Superior Mesenteric Artery Syndrome: A New Concept. Clinical endoscopy. 2020;53(1):94-6.

253. Yakan S, Calıskan C, Kaplan H, Deneclı AG, Coker A. Superior mesenteric artery syndrome: a rare cause of intestinal obstruction. Diagnosis and surgical management. The Indian journal of surgery. 2013;75(2):106-10.
254. Yan C, Hu ZW, Wu JM, Zhang C, Yan L, Wang ZG. Laparoscopic Toupet fundoplication with duodenojejunostomy for the management of superior mesenteric artery syndrome with reflux symptoms. Medicine. 2017;96(3):e5771.
255. Yao SY, Mikami R, Mikami S. Minimally invasive surgery for superior mesenteric artery syndrome: A case report. World journal of gastroenterology. 2015;21(45):12970-5.
256. Yazdanpanahi P, Keshtkar A, Atighi F, Foroughi M. Duodenojejunostomy following failed gastrojejunostomy in superior mesenteric artery syndrome: A case report. International journal of surgery case reports. 2024;116:109380.
257. Yoneda A, Kanetaka K, Yamaguchi S, Koga Y, Isagawa Y, Maruya Y, et al. Complete laparoscopic duodenojejunostomy for superior mesenteric artery syndrome: Linear stapled closure of the common enterotomy. Asian journal of endoscopic surgery. 2020;13(4):552-5.
258. Zachariah SK. Wilkie's syndrome: a rare cause of intestinal obstruction. BMJ case reports. 2014;2014.
259. Zarour CC, Zaki-Metias KM, Mian A, Vempala M, Ogunde B, Tsibulski A, et al. Superior mesenteric artery syndrome secondary to an abdominal aortic aneurysm. Clinical imaging. 2021;78:35-7.
260. Zhang ZA. Superior mesenteric artery syndrome: a vicious cycle. BMJ case reports. 2018;2018.
261. Zhu ZZ, Qiu Y. Superior mesenteric artery syndrome following scoliosis surgery: its risk indicators and treatment strategy. World journal of gastroenterology. 2005;11(21):3307-10.
262. Adame JD, Falconi G, Harberger S. A Case of Wilkie's Syndrome: Consideration of Alternative Diagnosis in the Setting of Chronic Abdominal Pain. Cureus. 2019;11(11):e6074.
263. Agarwalla R, Kumar S, Vinay A, Anuradha S. Laparoscopic duodenojejunostomy for superior mesenteric artery syndrome. Journal of laparoendoscopic & advanced surgical techniques Part A. 2006;16(4):372-3.
264. Agrawal S, Patel H. Superior mesenteric artery syndrome. Surgery. 2013;153(4):601-2.
265. Akashi T, Hashimoto R, Funakoshi A. Effect of a Novel, Energy-Dense, Low-Volume Nutritional Food in the Treatment of Superior Mesenteric Artery Syndrome. Cureus. 2021;13(5):e15243.
266. Al Faqeeh AA, Syed MK, Ammar M, Almas T, Syed S. Wilkie's Syndrome as a Rare Cause of Duodenal Obstruction: Perspicacity Is in the Radiological Details. Cureus. 2020;12(9):e10467.
267. Alaradi HM, Sr., Juma HR, Abdulnabi ZM, Isa M. A Rare Presentation of Superior Mesenteric Artery Syndrome as Acute Abdomen. Cureus. 2022;14(11):e31484.
268. Albano MN, Costa Almeida C, Louro JM, Martinez G. Increase body weight to treat superior mesenteric artery syndrome. BMJ case reports. 2017;2017.
269. Aldagher A, Almasri R, Mahmoud J. Superior mesenteric artery syndrome in an 8-year-old boy: a case report. Journal of medical case reports. 2023;17(1):343.
270. Ali M, Farooq O, Fatima M, Farooq H. Superior Mesenteric Artery Syndrome: Delayed Diagnosis of a Rare Clinical Entity With a Common Clinical Presentation. Cureus. 2022;14(7):e26728.
271. Ali T, Tomka J, Bakirli I, Bakirov I. Surgical Treatment of Wilkie's Syndrome by Vascular Transposition. Cureus. 2022;14(4):e24251.
272. Aljarad Z, Mahli N, Nasser M, Alobied M, Alkhaled M, Hamoud Alhussein MW, et al. Superior mesenteric artery syndrome caused by weight loss in a malnourished Syrian man. Gastroenterology report. 2019;7(3):223-5.
273. Almgren B, Juhl M. Superior mesenteric artery syndrome complicating treatment with balanced traction. A case report. Acta orthopaedica Scandinavica. 1977;48(1):25-8.
274. Alnaami MY. Robotic management of superior mesenteric artery syndrome. Surgical laparoscopy, endoscopy & percutaneous techniques. 2012;22(3):e144-7.

275. Alshaibani F. Superior Mesenteric Artery Syndrome in Down Syndrome: A Case Report. Cureus. 2022;14(11):e31854.
276. Alsulaimy M, Tashiro J, Perez EA, Sola JE. Laparoscopic Ladd's procedure for superior mesenteric artery syndrome. Journal of pediatric surgery. 2014;49(10):1533-5.
277. Froese AP, Szmuilowicz J, Bailey JD. The superior-mesenteric-artery syndrome: cause or complication of anorexia nervosa? Can Psychiatr Assoc J. 1978;23(5):325-7.
278. Sinagra E, Montalbano LM, Linea C, Giunta M, Tese L, La Seta F, et al. Delayed-onset superior mesenteric artery syndrome presenting as oesophageal peptic stricture. Case reports in gastroenterology. 2012;6(1):94-102.
279. Triki W, Baraket O, Moussa M, Karray O, Turki M, Bouchoucha S. [The superior mesenteric artery syndrome: A rare etiology for proximal obstructive syndrome in adult]. Presse Med. 2016;45(4 Pt 1):467-8.
280. Xie J, Bai J, Zheng T, Shu J, Liu ML. Causes of epigastric pain and vomiting after laparoscopic-assisted radical right hemicolectomy - superior mesenteric artery syndrome. World J Gastrointest Surg. 2023;15(2):193-200.
281. Singal R, Sahu PK, Goel M, Gupta S, Gupta R, Gupta A, et al. Superior mesenteric artery syndrome: A case report. N Am J Med Sci. 2010;2(8):392-4.
282. Dekonenko C, Hill JA, Sobrino JA, Snyder CL, St Peter SD, Oyetunji TA. Ligament of Treitz Release With Duodenal Lowering for Pediatric Superior Mesenteric Artery Syndrome. J Surg Res. 2020;254:91-5.
283. Lee CS, Mangla JC. Superior mesenteric artery compression syndrome. The American journal of gastroenterology. 1978;70(2):141-50.
284. Neri S, Signorelli SS, Mondati E, Pulvirenti D, Campanile E, Di Pino L, et al. Ultrasound imaging in diagnosis of superior mesenteric artery syndrome. J Intern Med. 2005;257(4):346-51.
285. Strong EK. Mechanics of arteriomesenteric duodenal obstruction and direct surgical attack upon etiology. Annals of surgery. 1958;148(5):725-30.
286. Bloodgood JC. X. Acute Dilatation of the Stomach—Gastro-mesenteric Ileus. Annals of Surgery. 1907;46(5):736.
287. Stavely AL. Acute and chronic gastromesenteric ileus with cure in a chronic case by duodenojejunostomy. Bull Johns Hopkins Hospital. 1908;19(252).