Review Article

Diagnosis and treatment of pseudoachalasia: how to catch the mimic

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Abstract: Pseudoachalasia, or secondary achalasia, is an uncommon esophageal dysmotility syndrome with symptoms and manometric findings indistinguishable from primary achalasia, but due to any mechanism other than idiopathic degeneration of the inhibitory neurons of the esophageal submucosal myenteric plexus. Whilst pseudoachalasia is rare, affecting some 1.4–5.4% of all achalasia patients, it is essential this diagnosis is always considered and excluded, as the treatment and outcomes for these patients will be very different from those with true achalasia. Pseudoachalasia can be difficult to differentiate from primary or "idiopathic achalasia". Several particular clinical features have been described as more common in patients with pseudoachalasia than in achalasia, but because of the low prevalence of this condition, the positive predictive value remains low. The majority of patients with pseudoachalasia have an underlying malignancy, predominantly gastro-esophageal adenocarcinoma, which is usually advanced. Management revolves around treating the underlying cause where possible, as this may lead to reversal of the esophageal dysmotility. In patients presenting with symptoms and manometry findings consistent with achalasia, the diagnosis initially should be one of an achalasia-like syndrome. Idiopathic achalasia can then only be confirmed after other potential causes have been considered and excluded. We describe a case of pseudoachalasia encountered in our clinical practice, followed by a review of current practice regarding diagnosis and management of pseudoachalasia.

Keywords: Esophageal motility disorders; pseudoachalasia; dysphagia; secondary achalasia

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Introduction

Achalasia is a functional motility disorder of the esophagus characterised by failure of lower esophageal sphincter (LES) relaxation, aperistalsis in the body of the esophagus and normal or increased resting LES pressure (1). Most cases of achalasia are idiopathic in nature and related to the progressive loss of inhibitory neurons of the myenteric plexus within the esophageal wall (2,3). A small proportion of patients who are initially diagnosed with achalasia are eventually found to have an identifiable pathology driving this process and thus diagnosed as having secondary achalasia or "pseudoachalasia".

The first documented observation of a likely case of pseudoachalasia was in 1919, when Howarth described two patients with gross esophageal dilatation without an obstructing luminal lesion, who were subsequently found to have small carcinomas in the wall of the abdominal esophagus at laparotomy (4). Ogilvie further described how malignant lesions of the gastric fundus could cause proximal

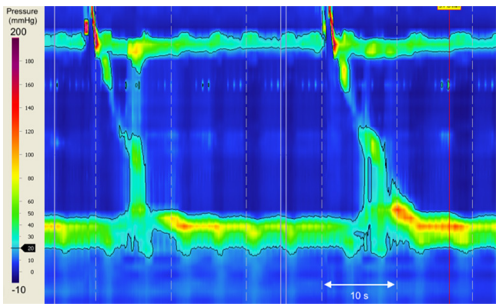

Figure 1 Esophageal high-resolution manometry consistent with esophago-gastric junction obstruction (non-relaxing) and potentially evolving achalasia (10 wet swallows, mean integrated relaxation pressure IRP =28 mmHg).

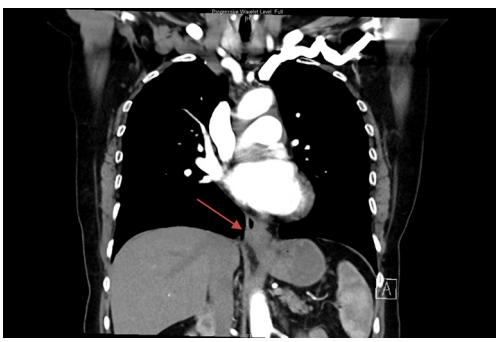

Figure 2 Cross-sectional computed tomographic image showing the patient's tumour located at the gastro-esophageal junction (GEJ)—red arrow.

esophageal dilatation and barium swallow appearances similar to "cardiospasm", an early term for achalasia (5). Additional reports of gastric cancer underlying a diagnosis of cardiospasm came from Park and Asherson (6,7).

Distinguishing primary "idiopathic" achalasia from secondary pseudoachalasia remains challenging for clinicians. Both conditions present with similar symptoms, manometric findings and appearances on radiological investigations. In order to maximise the likelihood of correctly diagnosing pseudoachalasia, the term 'idiopathic achalasia', as with other idiopathic conditions, should be considered as a diagnosis of exclusion. Because pseudoachalasia is such a close mimic of idiopathic achalasia, patients should be considered as having an 'achalasia-like syndrome' until secondary causes for esophageal dysmotility have been considered and excluded. The importance of differentiating the two conditions cannot be understated given the vastly different management required for pseudoachalasia, not to mention the prognostic significance for the patient.

We describe an example case of pseudoachalasia seen in our clinical practice. This is followed by a review of the available literature and a discussion on the key issues raised, with particular focus on diagnostic risk factors for and management of this rare clinical entity.

Case presentation

A 70-year-old woman presented to a peripheral centre with a three-month history of weight loss and progressive dysphagia to solids and liquids. An initial gastroscopy showed an esophagus of normal appearance with normal mucosa, but with significant resistance to passage of the gastroscope through the gastro-esophageal junction (GEJ). Cardia gastritis was visualised on retroflexion, which was biopsied and post-procedure histopathology confirmed gastritis. Following an esophageal high-resolution manometry (HRM), the differential diagnosis of achalasia was suspected (see *Figure 1*).

Treatment options were considered, and the patient was referred to our specialist centre and booked for a repeat endoscopic examination in preparation for a laparoscopic Heller myotomy.

At the subsequent endoscopy, performed 6 weeks after the original, a tight GEJ was evident which could be traversed and a Siewert 3 GEJ adenocarcinoma was identified. The tumour extended from the cardia into the distal esophagus. A CT abdomen/pelvis was performed and can be seen in *Figure 2*. A diagnostic laparoscopy found a serosal positive malignancy with positive cytology. With a revised diagnosis, the patient received palliative chemotherapy for her gastric malignancy.

Literature review

Methods

Due to the rarity of the condition, it was anticipated that there would not be sufficient high-quality trials to conduct a formal systematic review regarding pseudoachalasia. Therefore, a literature review using Cochrane, Embase, Medline and grey literature was performed to identify diagnostic methodologies, assessment tools and treatment approaches used for pseudoachalasia. Studies were only included if they were written in English and described the use of manometry in the diagnosis of pseudoachalasia. All

Table 1 Publications reporting large case series of pseudoachalasia

Author	Year of publication	Name of article	Journal	Number of patients
Ponds FA	2017	Diagnostic features of malignancy-associated pseudoachalasia	*Alimentary Pharmacology and Therapeutics*	18
Ellingson TL	1995	Iatrogenic achalasia	*Journal of Clinical Gastroenterology*	14
Liu W	2002	The pathogenesis of pseudoachalasia: a clinicopathologic study of 13 cases of a rare entity	*American Journal of Surgical Pathology*	13
Campo SM	2013	Pseudoachalasia: a peculiar case report and review of the literature	*World Journal of Gastrointestinal Endoscopy*	11
Katzka DA	2012	Achalasia secondary to neoplasia: a disease with a changing differential diagnosis	*Diseases of the Esophagus*	11
Stylopoulos N	2002	Development of achalasia secondary to laparoscopic Nissen fundoplication	*Journal of Gastrointestinal Surgery*	7
Tucker HJ	1978	Achalasia secondary to carcinoma: manometric and clinical features	*Annals of Internal Medicine*	7
Kahrilas PJ	1987	Comparison of pseudoachalasia and achalasia	*American Journal of Medicine*	6
Khan A	2011	Potentially reversible pseudoachalasia after laparoscopic adjustable gastric banding	*Journal of Clinical Gastroenterology*	6

authors felt manometry to be an essential investigation to reliably confirm esophageal aperistalsis and impairment of LES relaxation (8). Studies were excluded if the publication represented a missed or longstanding case of idiopathic achalasia, or if a case of malignancy was likely to be secondary to the achalasia rather than causing the syndrome. Malignancy complicating long-standing achalasia is a well described phenomenon, but usually presents differently with longer history of dysphagia and the histological subtype is usually squamous tumours located in the mid-esophagus (9).

Results

Database searches and grey literature searches identified 1,520 manuscripts. After the elimination of duplicate and irrelevant results, 200 full-text articles were retrieved. Of these, 109 articles met eligibility criteria comprising 222 patients with pseudoachalasia. All studies were retrospective and the majority were individual case reports with a few case series described (see *Table 1*) (10-18). The average age of patients with pseudoachalasia, where stated, was 59.2 years old with a range from 1.5 to 88 years old. One hundred and nineteen patients were male and 66 were female, with the rest not stated. This corresponds to a 1.8:1 male-to-female ratio. The most common underlying cause was esophago-gastric malignancy, which was cited in 86 cases (39%). Sixty-three patients were excluded, for either not having manometry (60 patients) or lacking a clinical presentation that was truly one of pseudoachalasia. Previous reviews of pseudoachalasia have included patients who did not undergo a manometry study. This partly explains why there are fewer cases of gastro-esophageal cancer reported in our current review than counted previously.

Discussion

Epidemiology

Idiopathic achalasia remains a rare disease. A 2017 study looking at the incidence of achalasia in South Australia found an incidence of 2.3–2.8 cases per 100,000 per year (19). This study specifically excluded patients with a potential secondary cause of achalasia. Other studies of idiopathic achalasia, performed since the introduction of high-resolution esophageal manometry, quote an incidence ranging from 0.3–1.8 per 100,000 per year (20-22). Estimating the incidence

Table 2 List of underlying malignancies reported in the literature to have caused pseudoachalasia

Malignancies reported to cause pseudoachalasia
Gastro-esophageal adenocarcinoma
Lung cancer (Inc. adenocarcinoma, neuroendocrine carcinoma, SCC and small cell carcinoma)
Malignant mesothelioma
Breast cancer
Pancreatic adenocarcinoma
Sarcoma
Esophageal SCC
Cholangiocarcinoma
Diffuse large B-cell lymphoma
Prostate cancer
Renal cell carcinoma
Bladder urothelial cell carcinoma
Cervical SCC
Hepatocellular carcinoma
Hepatic SCC
Multiple endocrine neoplasia Type 2b
Gastric lymphoma
Pharyngeal SCC
Hodgkin's lymphoma

SCC, squamous cell carcinoma.

and prevalence of pseudoachalasia is more challenging. Most estimates of the incidence of secondary causes for achalasia amongst all patients with achalasia-like syndromes are based on relatively small case series. In these case series, pseudoachalasia reportedly accounts for 1.5–5.4% of all achalasia cases, thereby representing a small fraction of an already rare condition (10,11,14,23-25).

Etiologies

Pseudoachalasia can be a manifestation of several malignant and benign pathologies. The most common underlying lesion is a primary malignant neoplasm of the proximal stomach or distal esophagus; responsible for between 50–75% of cases of pseudoachalasia (10,11,25). A wide variety of other malignancies can be complicated by the development of pseudoachalasia, either through direct invasion from contiguous structures or local mass effect from metastatic deposits. Malignancies reported to cause pseudoachalasia in this way are described in the *Table 2* (26-42). Extremely rarely, pseudoachalasia is reported in association with paraneoplastic syndromes (14,43). Such syndromes mostly occur in the setting of neuroendocrine and squamous cell carcinomas of the lung (14). Benign causes of pseudoachalasia are less common and include certain operative procedures, non-operative trauma, as well as a variety of benign pathologies summarised in *Table 3* (15,44-54).

Pathogenesis

Whilst the conditions known to cause pseudoachalasia have been identified, the mechanism behind the characteristic motility abnormalities that mimic idiopathic achalasia is poorly understood. It is likely that because of the many potential causative pathologies, the pathogenesis of pseudoachalasia is not uniform across all cases.

Table 3 Etiologies of pseudoachalasia

Cause	Number of cases (%)
Malignant	
Gastro-esophageal adenocarcinoma	89 (40.1)
Lung cancer (Inc. adenocarcinoma, neuroendocrine carcinoma, SCC and small cell)	16 (7.2)
Malignant mesothelioma	9 (4.1)
Breast cancer	8 (3.6)
Pancreatic adenocarcinoma	7 (3.2)
Sarcoma	3 (1.4)
Other malignancies	19
Benign	
Post-operative complications	38 (17.3)
Leiomyoma	8 (3.6)
Amyloidosis	5 (2.3)
Neurofibromatosis	4 (1.8)
Systemic sclerosis	4 (1.8)
Other benign conditions	12 (5.45)

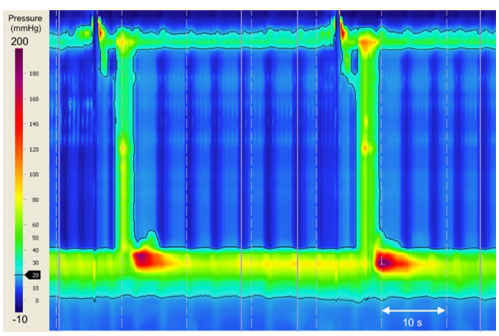

Figure 3 Esophageal high-resolution manometry consistent with achalasia-like syndrome (10 wet swallows, mean integrated relaxation pressure IRP =64 mmHg) presenting 14 years after laparoscopic Nissen fundoplication with hiatal repair. Pre-operative motility noted normal esophageal peristalsis and complete relaxation of gastroesophageal junction on swallowing, thus considered a presentation of post-surgical pseudoachalasia.

Two mechanisms put forward for pseudoachalasia seen in malignancy are direct mechanical obstruction and submucosal infiltration, with subsequent destruction of neuronal cells of the myenteric plexus. Mechanical obstruction is often quoted as a cause of pseudoachalasia, however the characteristic finding on endoscopy in pseudoachalasia is the lack of an obvious stenosing lesion or malignant stricture and a macroscopically normal mucosa.

In many cases of pseudoachalasia, submucosal infiltration of the myenteric plexus by tumour cells producing secondary neuronal inhibition of esophageal peristalsis is the proposed mechanism for inducing an achalasia-like syndrome. This hypothesis is supported by findings from histological examinations, demonstrating massive submucosal tumour infiltration replacing the ganglion cells and the absence of a stenosing mucosal lesion (55-59).

Another proposed mechanism for pseudoachalasia secondary to metastatic malignancy is a localised peripheral neuropathy of the vagus nerve (27,60). This association of pseudoachalasia with damage to the main trunk of the vagus nerve would be in keeping with one of the proposed mechanisms for pseudoachalasia following operative and non-operative trauma (1). Contrary to this explanation is the observation in animal models that achalasia-like manometry findings are only reproducible if both vagi are transected in the cervical region or around the hila of the lungs. Typical manometric findings for achalasia-like syndrome did not develop when more distal esophageal vagal branches near the lower sphincter were interrupted (61).

Several operations may inadvertently give rise to the development of pseudoachalasia. Current procedures include Nissen fundoplication, laparoscopic adjustable gastric banding (LAGB), and hiatus hernia repair (13,62,63). Dysmotility can occur even many years after the index operation (*Figure 3*) (63-65). Proposed mechanisms implicated in the development of pseudoachalasia following upper gastro-intestinal (GI) surgery include: fibrosis around the GEJ; post-operative edema; stricture formation; malformation of the fundal wrap, disruption of the fundal wrap and recurrent hiatus hernia (66). Poulin *et al.* have suggested a categorisation system of achalasia-like dysmotility seen after upper GI surgery:

(I) type 1 represents synchronous primary achalasia misdiagnosed as gastro-esophageal reflux disease before intervention,

(II) type 2 is true secondary achalasia, secondary to iatrogenic fibrosis, edema or stricture and

(III) type 3 is metachronous primary achalasia developing years after surgery without any evidence of esophageal pathology relating to the previous surgery (65).

Nissen fundoplication and LAGB are the procedures

most often implicated in post-surgical pseudoachalasia (18,67). There is also experimental evidence in a feline model that reversible achalasia can be induced, by placing a constrictive band around the distal esophagus of animals (68). This raises the possibility that the mechanical effect of an improperly constructed fundoplication wrap or subsequent fibrosis as well as bariatric surgery can cause pseudoachalasia.

Other reported causes of pseudoachalasia which are not related to direct mechanical compression or vagal involvement are paraneoplastic syndromes, usually in association with lung cancer, and sarcoidosis (43,46).

In pseudoachalasia, regardless of the initial underlying pathology, the end result is a functional obstruction of the distal esophagus due to failure of LES relaxation with resultant esophageal dilatation and stasis. Ultimately, this GEJ outflow obstruction leads to an altered neuromuscular response in attempt to overcome the functional blockage. If GEJ outflow obstruction continues unabated, and is not relieved, this eventually leads to failure of normal esophageal motility and thus symptomatology and manometric findings consistent with achalasia arises (12,69).

Clinical features

Pseudoachalasia presents in an identical manner to idiopathic achalasia with progressive dysphagia to solids and liquids, retrosternal pain, regurgitation of undigested foods and weight loss (11). This makes differentiating the two diagnoses based on symptoms alone impossible. Several authors have identified symptoms that may be more pronounced in patients with pseudoachalasia. Patients who present at an older age (≥55-year-old); have shorter duration of dysphagia (≤12 months); and have pronounced weight loss (≥10 kg) are at higher risk of pseudoachalasia versus idiopathic achalasia (25,70,71). These criteria are highly sensitive, but only moderately specific. When the diagnostic risk factor of difficulty passing the endoscopy through the GEJ is added to the above criteria, then the presence of two or more of these risk factors increases the likelihood of pseudoachalasia, with a specificity of 77–99.7% and sensitivity of 28–50%. However low prevalence of this condition amongst patients with manometric findings of achalasia, means these risk factors have a low positive predictive value (72).

Duration of symptoms

The onset of dysphagia in idiopathic achalasia is typically more insidious with only 16% presenting in the first year of symptom onset (73). In a cohort of 5 patients with pseudoachalasia, Tracey and Traube found patients with pseudoachalasia had symptomatic dysphagia for a much shorter time course compared to 10 patients with idiopathic achalasia (72). Kahrilas *et al.* found in a comparison of six patients with pseudoachalasia versus 167 with primary achalasia, that all patients with pseudoachalasia had symptoms for less than 10 months compared with 5% of primary achalasia patients with symptoms <12 months (25). Nevertheless, this 5% represents eight patients, which is more than the total pseudoachalasia cases in their series. This report confirms the suggested discriminating features have a low predictive value.

Weight

Significant weight loss (>10 kg) is a clinical feature often quoted to be more common in pseudoachalasia. Pronounced weight loss (>10 kg) is unusual in idiopathic achalasia. However, it is well-recognised that even with idiopathic achalasia, significant weight loss can be seen. This is reflected in the inclusion of weight loss as a component of the Eckardt score for clinical severity of achalasia (74). For Tracey *et al.'s* cohort, overall weight loss was similar between patients with pseudoachalasia and controls. However, the rate of weight loss (as determined by weight loss and duration of dysphagia) was significantly higher in the pseudoachalasia group which may make this a more sensitive indicator.

Age

Adults with pseudoachalasia are often older than patients with idiopathic achalasia. Bessent *et al.* reports the average presenting age of patients with achalasia is 40-year-old, whereas it is 62-year-old for patients with gastro-esophageal cancer (most common etiology for pseudoachalasia) (55). Only 15% of patients with idiopathic achalasia present older than 60 years of age (73). Woodfield *et al.*, in a series of 10 patients and Ponds *et al.* with a series of 18 patients, show similar findings for age at presentation (16,75). Whilst older age at presentation should raise the suspicion of pseudoachalasia, exceptions to this are reported. Several cases of pseudoachalasia secondary to gastric adenocarcinoma have occurred in adolescents as young as 15- and 16-year-old (76,77).

Investigations

The diagnosis of pseudoachalasia remains challenging and

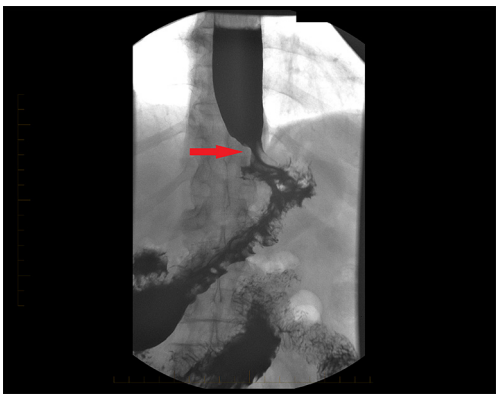

Figure 4 A barium swallow showing pseudoachalasia secondary to junctional adenocarcinoma (red arrow).

multiple modalities often fail to obtain a correct diagnosis in a timely fashion. Initial investigation findings mimic primary achalasia and biopsy findings are frequently negative. A high degree of suspicion is required to persist with further investigations, despite all initial evidence suggesting a primary esophageal motility disorder. If there is anything unusual about the patient's presentation raising the possibility of a malignancy, further testing and even repeated investigations should be performed.

The appearances on barium swallow for achalasia and pseudoachalasia are highly similar or identical. *Figure 4* demonstrates a barium swallow from a patient with a junctional adenocarcinoma presenting as pseudoachalasia. Specific features that may suggest underlying pseudoachalasia include a longer length of the narrowed distal esophageal segment (>3.5 cm) and narrower diameter (<4 cm) of the esophageal body compared with idiopathic achalasia (75).

Endoscopic examination of the oesophagus and stomach is mandatory in the investigation of dysphagia. In cases of pseudoachalasia there is no intra-luminal occlusive lesion and the mucosa is macroscopically normal although some nodularity can be observed (78). Multiple endoscopies and biopsies of the mucosa will often fail to identify an underlying malignancy (36,79-82). In idiopathic achalasia, while the manometric resting tone of the LES is often increased, there is usually no resistance to the passage of an endoscope through the GEJ. Conversely, a common finding in patients with pseudoachalasia is difficulty passing the endoscope through the GEJ (72,79,83,84). This is usually due to an underlying malignant cause. Retroflexion of the endoscope in the stomach to fully inspect the gastric fundus and cardia is essential, to try and visualise potential causative lesions (78).

Manometry remains the gold standard test for diagnosing achalasia, by proving the presence of impaired GEJ relaxation and esophageal aperistalsis (8,85). The introduction of esophageal high-resolution manometry (HRM) in combination with esophageal pressure topography (EPT) has allowed for objective and highly reproducible measurements to be taken. In a series reported by Menin *et al.*, a pattern was observed with conventional manometry in 11 patients with pseudoachalasia secondary to gastric tumours that was characterised by high-amplitude, repetitive, non-progressive contractions. This pattern was described as similar to that of "vigorous achalasia" (86). While vigorous achalasia is now an outdated term in the era of HRM, this represented an early effort to subgroup achalasia phenotypes based on esophageal pressure patterns. More recently, a retrospective evaluation of manometric patterns using HRM in patients with pseudoachalasia, revealed HRM pressure patterns often fail to neatly identify with an achalasia subtype based on the Chicago Classification (87). This study comparing manometric features of achalasia with pseudoachalasia secondary to esophago-gastric adenocarcinoma found compartmentalised pressurisation confined to the distal esophagus was a consistent finding in the pseudoachalasia patients. The authors propose this finding may be a useful clue to differentiate idiopathic and pseudoachalasia, while recognising further studies are needed (87).

Endoscopic ultrasound (EUS) provides a highly useful modality for the identification of occult tumours likely to be causing pseudoachalasia. This investigation offers several advantages to endoscopy alone in the setting of pseudoachalasia. Firstly, the esophageal mucosa is usually macroscopically normal in cases of pseudoachalasia, belying the usual causative malignancy infiltrating the wall of the organ. This submucosal pathology is better visualised with EUS, revealing abnormal submucosal thickening often not readily appreciated on computed tomographic (CT) imaging (82). Additionally, EUS combined with fine-needle aspiration of abnormal lesions can provide a histological diagnosis for the underlying pathology, where previous endoscopic mucosal biopsies have failed (88-90). If there is difficulty passing the endoscope through the GEJ at the initial study, or nodularity/ulceration is seen at this area on passage of the scope, then it might be prudent to use EUS at the repeat endoscopy (91). A study found that EUS performed in addition to HRM for patients with esophageal motility disorders, identified clinically significant lesions in

nine out of 62 patients (15%) (92). This included two cases of esophagogastric carcinoma, one case of sarcoidosis and one of leiomyoma.

A CT of the chest and abdomen is undertaken at some point during the diagnostic work-up for most patients with pseudoachalasia. As an imaging modality it has limited sensitivity for detecting tumours around the GEJ, even those with significant local invasion (14,93). There are, therefore, limitations in the ability of this modality to confidently distinguish between pseudoachalasia and achalasia. In one study CT only identified the underlying malignancy in two of eight patients with achalasia (94). Further, it incorrectly diagnosed a patient with achalasia as having an underlying malignancy. Esophageal wall thickening is commonly seen in both achalasia and pseudoachalasia. This same study found that symmetrical esophageal wall thickening <10 mm was likely to be achalasia; whereas asymmetrical esophageal wall thickening >10 mm (especially at the GEJ) was observed in pseudoachalasia patients. In another study CT was only able to detect a mass at the GEJ in 40% of patients who were eventually found to have a tumour masquerading as achalasia [109].

In summary, in order to not miss a case of pseudoachalasia, if a patient with manometric pressure patterns indicating an achalasia-like syndrome has had a normal endoscopy carefully consider the duration of dysphagia and severity of weight loss as well as previous GI surgery. When a patient, especially one over the age of 55, has a short symptomatic duration and pronounced weight loss, repeat endoscopic review of the GEJ anatomy with biopsies, as well as EUS is recommended. If EUS is negative, then CT chest/abdomen or other cross-sectional imaging should be undertaken to try and identify any underlying pathology (95). This combination of investigation modalities is likely to catch the vast majority of cases of pseudoachalasia and will allow such patients to be managed appropriately.

Management

The management of pseudoachalasia consists of treating the underlying cause driving the motility disorder where possible. This is the ideal, as there are reports of the achalasia-like syndrome resolving following successful treatment of the inciting pathology (33,86). Where malignancy is the cause, surgical resection of the primary gastro-intestinal tumour, as well as chemotherapy and radiotherapy to distant metastases has in some settings achieved resolution of the esophageal dysmotility (33,86,96,97). Unfortunately, the majority of the patients will have pseudoachalasia secondary to an esophageal or gastric cancer that is usually locally advanced at diagnosis, in no small part due to the difficulties in achieving an accurate diagnosis. Due to the locally advanced nature of many tumours presenting as pseudoachalasia, cure is often not possible. Management in this setting focuses on best palliation including resolution or reduction of dysphagia. In cases associated with benign conditions or in the setting of localised malignancy, the management of pseudoachalasia revolves around the treatment of the inciting etiology. In particular benign pseudoachalasia as a complication of previous esophago-gastric surgery, usually resolves following surgical revision with resolution of dysmotility (65,66).

Patients whose pseudoachalasia is initially misdiagnosed as idiopathic achalasia, will often be subjected to pneumatic balloon dilatation. This will provide either temporary relief or no benefit at all in the patient with dysphagia and pseudoachalasia secondary to malignancy (26,88). Moreover, this treatment can delay the diagnosis of the underlying malignancy and there is a higher risk of pneumatic dilatation causing esophageal perforation in this setting (24). If pneumatic balloon dilatation is attempted in the presence of a cardia tumour, the true diagnosis can be alluded to when the endoscopist notices a lack of distensibility, with the balloon failing to reach proper outline under pressure, as visualised using fluoroscopy (29,88,98,99). Balloon dilatation has some success however in patients whose pseudoachalasia is secondary to benign conditions, such as vagal damage and operative trauma (12,100). Such patients will have a pre-existing history of identifiable trauma, usually from operative procedures around the GEJ or involving the vagus nerve. Other benign etiologies of pseudoachalasia treated successfully with balloon dilatation are amyloidosis and pseudoachalasia in the setting of neurofibromatosis (45,101,102).

Whilst botulinum toxin (Botox) injection of LES is an effective, proven treatment of idiopathic achalasia, by reducing LES pressure and cholinergic tone, it does not have any place in the management pseudoachalasia and will not provide any sustained symptomatic improvement (27,50). Patients who may theoretically respond to Botox are those where destruction of myenteric plexus nerves either directly or through a paraneoplastic syndrome (14).

Patients undergoing surgery involving manipulation around the GEJ often experience dysphagia in the early post-operative period. Such patients have also been shown to have significantly reduced primary peristalsis on manometry which typically improves after 3 months (103). Those who do not improve despite conservative treatment

and who have dysmotility confirmed with manometry should undergo a full suite of standard investigations (endoscopy, manometry and fluoroscopy) with a view to revisional surgery to correct the identified problem. If still no improvement occurs, they should have their surgery revised if possible (10,63,104). During revision surgery some authors have also performed a concurrent Heller myotomy (64,104). In such cases it is unclear whether the revision itself or the myotomy was the deciding factor in each patient's improvement. Procedures causing pseudoachalasia where revision of the procedure has been documented to reverse the dysmotility disorder are Nissen fundoplication and LAGB (13,63,105). In the case of Nissen fundoplication revision, usually a Dor fundoplication is performed after taking the old wrap down in order to treat the pseudoachalasia whilst preventing recurrence of reflux disease (63). With a LAGB, the first step in management is to remove the fluid from the band and if this fails to improve symptoms then to proceed to component removal, and importantly any fibrotic tissue encasing the band must also be removed (13,64,106).

Conclusions

The recognition and timely management of pseudoachalasia remains a challenge for clinicians due to the close resemblance to idiopathic achalasia. The etiology of most cases of secondary achalasia remains a variety of primary and metastatic malignant neoplasms. Clinical features of older age at presentation, pronounced weight loss and shorter duration of dysphagia prior to presentation as well as the feature on endoscopy of difficulty passing the scope through the GEJ should raise clinical suspicion of a secondary cause despite these features still having a low positive predictive value. A repeat endoscopy should be undertaken if there is diagnostic doubt. If doubt still lingers, EUS should be considered, or where not available, CT chest/abdomen by a highly experienced radiologist. Management will vary, depending on the likely underlying cause. The overarching management aim in pseudoachalasia is the successful treatment of the underlying cause, as this has often shown to reverse the esophageal dysmotility.

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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