



A rare cause of dysphagia and simultaneous hoarseness of voice in the octogenarian: a Killian–Jamieson diverticulum, management, and review of literature

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Killian–Jamieson diverticulum: An 82-year-old male presented with progressive dysphagia and simultaneous hoarseness of voice for the past 6 months. He had mitral valve repair and a permanent pacemaker for a heart block 5 years ago. A computed tomographic scan of the neck demonstrated a cervical esophageal diverticulum. Oral Gastrogriffin contrast study confirmed esophageal diverticulum in Killian–Jamieson space. Open surgical diverticulectomy was performed safely. Patient's dysphagia resolved immediately, and he regained his normal voice after 6 weeks.

Introduction: Killian–Jamieson's esophageal diverticulum is a rare form of pulsion diverticulum which originate through a muscular gap in the anterolateral wall of the esophagus, inferior to the cricopharyngeus muscle and superior to the circular and longitudinal muscle of the esophagus. Killian–Jamieson defined this area where the recurrent laryngeal nerve enters the pharynx, called Killian–Jamieson triangle. Ekberg and Nylander, in 1983, described an esophageal diverticulum in Killian–Jamieson space. The most common clinical manifestations in such patients are dysphagia, cough, epigastric pain, recurrent respiratory tract infections, and rarely hoarseness of voice. In symptomatic patients, surgical or endoscopic resection of the diverticulum is mandatory. We report this case in line with SCARE (Surgical CAse REport) criteria.

Case Report: An 82-year-old male presented to our outpatient clinic with a history of progressive dysphagia for solid food and hoarseness of voice for the last 6 months. He denied gastroesophageal reflux, cough, and shortness of breath. On examination of the neck, there was swelling on the left side but no tenderness or lymphadenopathy. Basic blood investigations, including complete blood count, liver, and renal panels, were normal. An echocardiogram showed mild impairment of left ventricle function and normally functioning mitral valve. Chest X-ray showed a pacemaker in position. Computed tomography scan of the neck showed esophageal diverticulum. Gastrogriffin contrast study showed esophageal Killian–Jamieson diverticulum (KJD).

Discussion: The acquired esophageal diverticulum is categorized into three types based on its anatomical location. Zenker's and Killian–Jamieson (pulsion diverticulum) in the proximal part, traction diverticulum in the middle part, due to pulling from fibrous adhesions following the lymph node infection and epiphanic pulsion type in the distal esophagus. Although the KJD and Zenker's diverticulum (ZD) arise close to each other in the pharyngoesophageal area, they are anatomically distinct. Although ZD and KJD have the same demographic features, they are more commonly found in older men (60–80 years) and women, respectively. The incidence of ZD is 0.01–0.11%, and KJD is 0.025% of the population. Rubesin *et al.* reported radiographic findings in 16 KJD cases. They found the majority of them were on the left side (72%), followed by 20% on the right side and 8% bilateral.

Conclusion: In conclusion, we report a rare case of dysphagia and simultaneous hoarseness of voice in an octogenarian due to KJD, who was treated with open diverticulectomy, and dysphagia resolved; he regained his voice back after 6 weeks. In our opinion, endoscopic surgery in such a patient with KJD can put recurrent laryngeal at risk of injury since an endoscopic approach operator cannot visualize and dissect away the recurrent laryngeal nerve, particularly when KJD already compresses it.

Keywords: diverticulum, esophagus, Killian–Jamieson, surgery

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Introduction

Killian–Jamieson’s esophageal diverticulum is a rare form of pulsion diverticulum which originate through a muscular gap in the anterolateral wall of the esophagus, inferior to the cricopharyngeus muscle and superior to the circular and longitudinal muscle of the esophagus. Killian–Jamieson defined this area where the recurrent laryngeal nerve enters the pharynx, called Killian–Jamieson triangle^[1,2] (Fig. 1). Ekberg and Nylander^[3], in 1983, described an esophageal diverticulum in Killian–Jamieson space. The most common clinical manifestations in such patients are dysphagia, cough, epigastric pain, recurrent respiratory tract infections, and rarely hoarseness of voice. In symptomatic patients, surgical or endoscopic resection of the diverticulum is mandatory. We report this case in line with SCARE (Surgical CAse REport) criteria^[4].

Case report

An 82-year-old male presented to our outpatient with a history of progressive dysphagia for solid food and hoarseness of voice for the last 6 months. He denied gastroesophageal reflux, cough, and shortness of breath. On examination of the neck, there was swelling on the left side but no tenderness or lymphadenopathy. Basic blood investigations, including complete blood count, liver, and renal panels, were normal. An echocardiogram showed mild impairment of left ventricle function and normally functioning mitral valve. Chest X-ray showed a pacemaker in position (Fig. 2). Computed tomography (CT) scan of the neck showed esophageal diverticulum (Fig. 3A, B). Gastrogriffin contrast study showed esophageal Killian–Jamieson diverticulum (KJD) (Fig. 4A, B).

We contacted a Medtronic representative to reprogram the pacemaker from demand mode to fixed mode on the day of surgery.

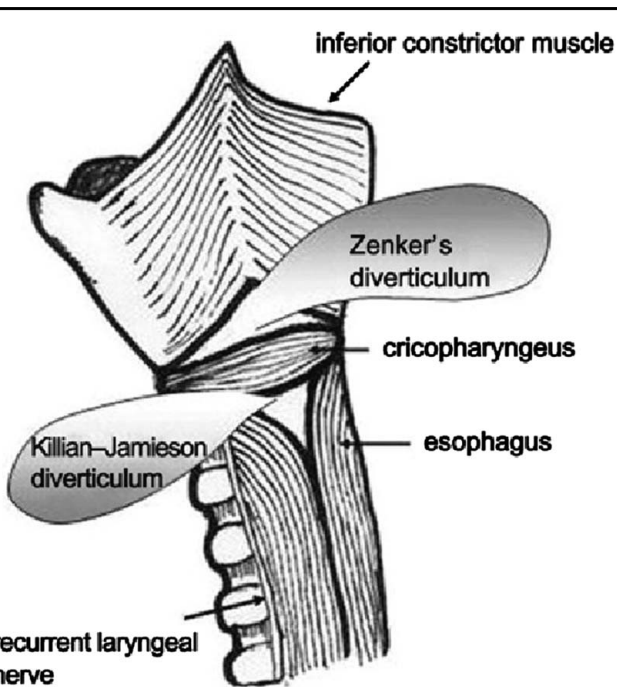


Figure 1. Drawing demonstrates the origin of Zenker’s diverticulum and Killian–Jamieson diverticulum and its relation with recurrent laryngeal nerve.

HIGHLIGHTS

- We report a rare case of Killian–Jamieson diverticulum in octogenarian.
- Computed tomography scan and contrast study confirmed the diagnosis.
- An open diverticulectomy was performed.
- The patient postoperative recovery was uneventful, and his symptoms resolved completely.

We approached the cervical esophagus through the neck incision along the anterior border of the sternocleidomastoid muscle; after identification, the diverticulum was carefully dissected free from surrounding structures to its origin (Fig 5A–D). A wide-bore nasogastric tube was inserted into the esophagus, and the diverticulum was stapled and removed (Fig. 2). The patient was extubated on the table, and the pacemaker was reprogrammed to demand mode. On the second postoperative recovery, the esophageal contrast study showed the free flow of contrast and no leak (Fig. 4C, D). The patient resumed a soft diet and subsequently continued with solids. Dysphagia resolved immediately and hoarseness 6 weeks after the surgery. The patient resumed back to his normal life.

Discussion

The acquired esophageal diverticulum is categorized into three types based on its anatomical location. Zenker’s and Killian–Jamieson (pulsion diverticulum) in the proximal part, traction diverticulum in the middle part, due to pulling from fibrous adhesions following the lymph node infection and epiphagic pulsion type in the distal esophagus^[5,6]. Although the KJD and ZD arise close to each other in the pharyngoesophageal area, they are anatomically distinct. Although ZD and KJD have the same demographic features, they are more commonly found in older men (60–80 years) and women, respectively. The incidence of ZD is 0.01–0.11%, and KJD is 0.025% of the population^[7,8]. Rubesin *et al.* reported radiographic findings in 16 KJD cases.



Figure 2. Chest X-ray showing pacemaker in position.

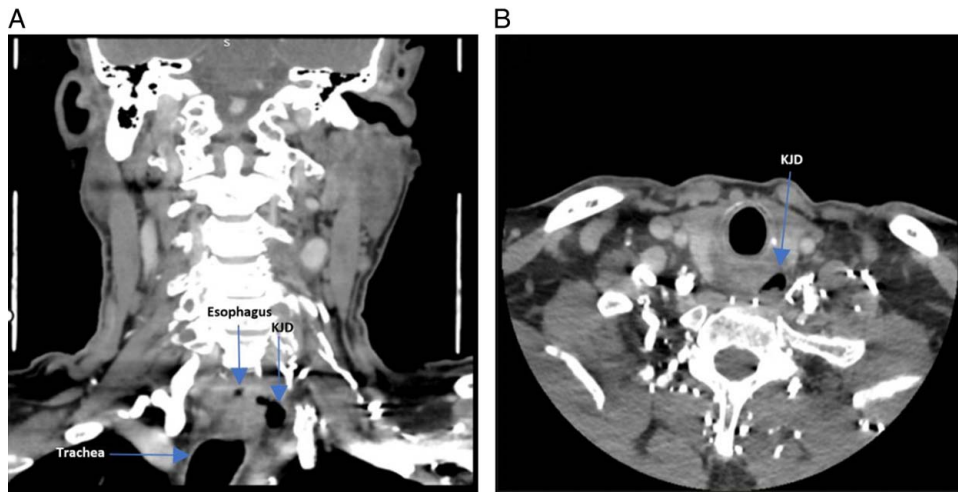


Figure 3. Computed tomography scan neck (A, B) showing esophageal diverticulum (Killian–Jamieson diverticulum).

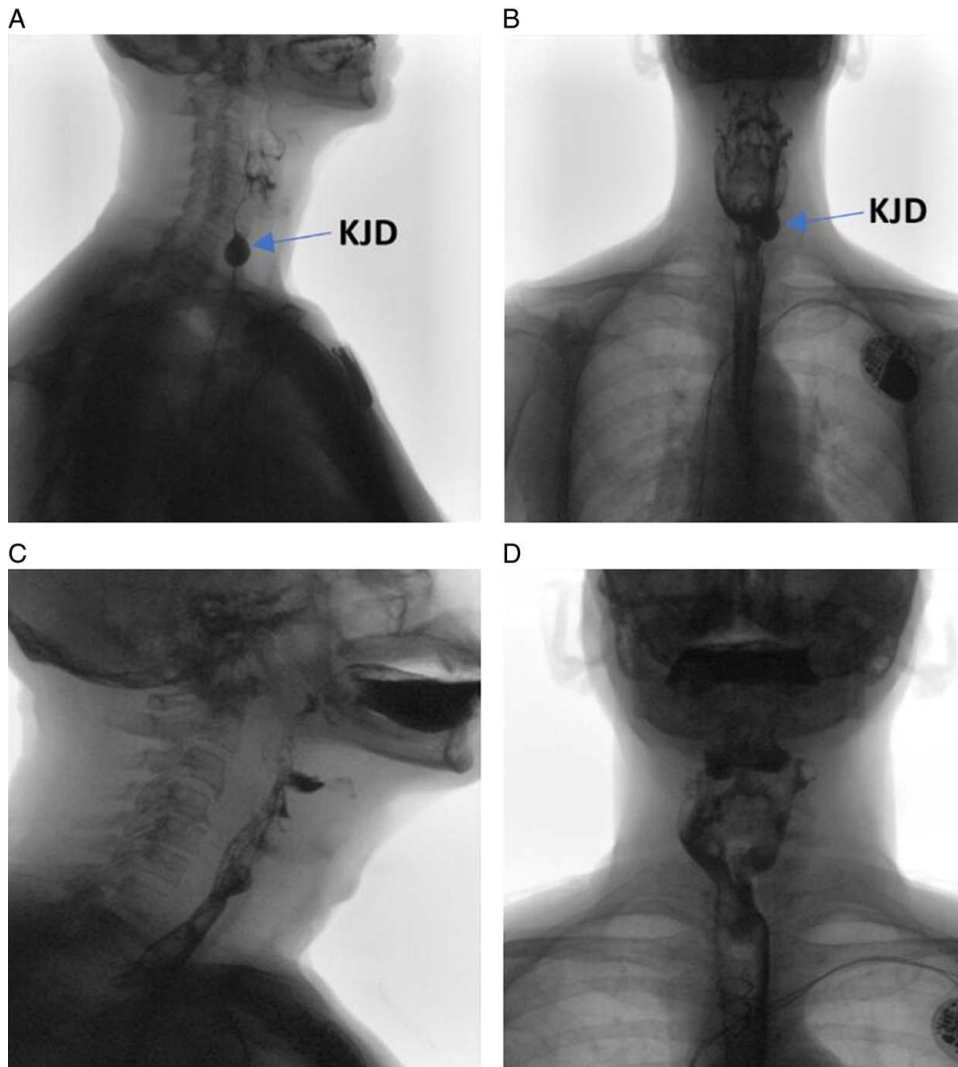


Figure 4. A,B preoperative Gastrografin swallow showing KJD. C,D postoperative Gastrografin swallow showing normal esophagus.

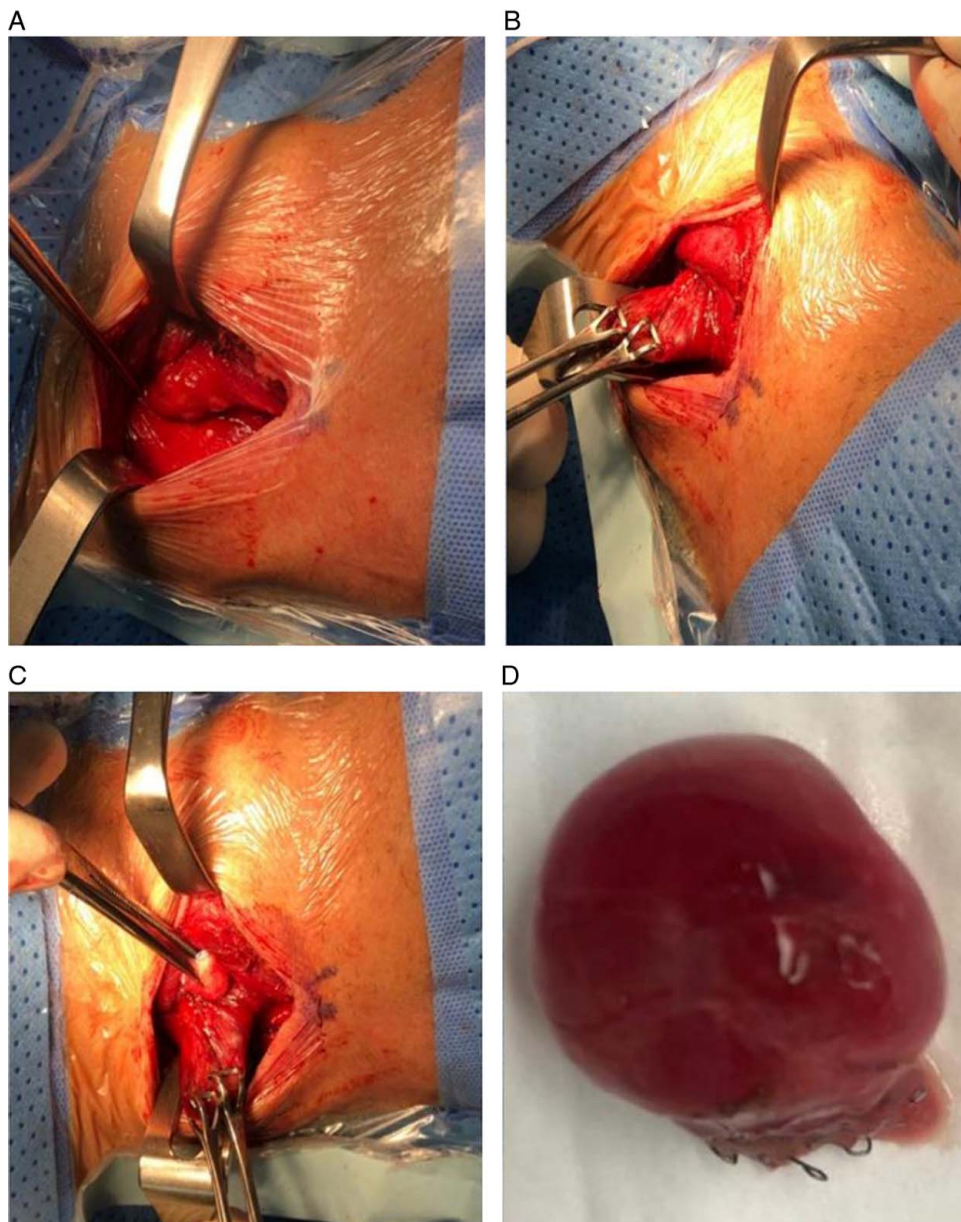


Figure 5. (A–C) Surgical exposure of Killian–Jamieson diverticulum and its origin from the esophagus. (D) Excised esophageal Killian–Jamieson diverticulum.

They found the majority of them were on the left side (72%), followed by 20% on the right side and 8% bilateral^[9]. Pathogenies of KJD are based on the hypothesis that fictional outflow obstruction due to the inappropriate contraction of circular muscle leads to increased intraluminal pressure, which is transmitted to the weak. Another theory is that it can be due to inappropriate contraction of longitudinal and circular muscles of the esophagus associated with gastroesophageal reflux disease^[10,11]. The KJD is often asymptomatic, but sometimes the patient can present with clinical manifestations similar to ZD patients, dysphagia, cough, respiratory tract infection due to aspiration regurgitation, chest pain, and rarely hoarseness of voice^[12].

Ultrasound of the neck is advised to differentiate between a thyroid nodule and KJD, as the cases have been reported as a KJD presenting synchronously with a thyroid nodule^[13].

Barium swallow (pharangesophagogram) and cervical CT scan are the best diagnostic imaging modalities. The cervical CT scan can determine the origin of KJD and differentiate between ZD. There are three methods used for treating KJD conventional diverticulectomy (67%) followed by endoscopic diverticulectomy (28%), and diverticulopexy (5%)^[14].

Open surgical diverticulectomy is performed through a transverse or vertical neck incision with or without esophagostomy. Furthermore, Siow *et al.* reported that KJD is not associated with sphincter dysfunction and therefore did not require esophageal myotomy. The role of cricopharyngeal and proximal esophagostomy is controversial because KJD arises below the cricopharyngeal muscle^[15,16]. The literature study showed that open diverticulectomy is performed in the majority of cases^[17–20] (Table 1). Endoscopic diverticulectomy for KJD is not a common practice because there is a high risk

Table 1
To date reported cases of Killian–Jamieson diverticulum and treatment

References	Age (years)	Gender	Site	Size (cm)	Management	Complication	Follow-up (months)
Roger <i>et al.</i> ^[13]	53	F	Lt	NA	Open diverticulectomy myotomy	None	24
Present study ^[17–20]	55	F	Lt	1.6	Endoscopic diverticulectomy	None	3
Tang <i>et al.</i> ^[23]	51	F	Lt	1.5	Endoscopic diverticulectomy	None	2
Boisvert <i>et al.</i> ^[18]	69	M	Bi	4.5/3.5	Diverticulectomy, esophageal open myotomy	None	2
Present study ^[17–20]	53	F	Lt	4.5	Open diverticulectomy	None	2
Chea <i>et al.</i> ^[11]	52	F	Rt	NA	Open diverticulectomy	None	6
Undavia <i>et al.</i> ^[17]	62	F	Lt	2.5	Open diverticulectomy	None	NA
Kim <i>et al.</i> ^[19]	68	M	Rt	10	Open diverticulectomy, esophageal myotomy	None	6
Mimatsu <i>et al.</i> ^[15]	74	F	Bi	1.5/4	Open diverticulectomy	NA	24
Present study ^[17–20]	54	F	Rt	NA	Open diverticulectomy, esophageal myotomy	NA	24
Present study ^[17–20]	18	F	Rt	NA	Open diverticulectomy	None	12
Chang <i>et al.</i> ^[22]	46	F	Lt	5	Endoscopic diverticulectomy	None	6
Present study ^[17–20]	49	M	Rt	NA	Open diverticulectomy	None	6
Present study ^[17–20]	49	F	Lt	NA	Open diverticulectomy	None	3
Present study ^[17–20]	2	F	Rt	NA	Open diverticulectomy	NA	5
Present study ^[17–20]	88	M	Lt	2.5	Endoscopic diverticulectomy	NA	1
Stewart <i>et al.</i> ^[7]	69	M	Rt	NA	Open diverticulectomy	None	2
Present study ^[17–20]	71	F	Lt	2.5	Endoscopic diverticulectomy	None	2
Saisho <i>et al.</i> ^[14]	77	F	Lt	2	Open diverticulectomy	None	24
Present study ^[17–20]	52	M	Lt	NA	Conservative	NA	NA
Present study ^[17–20]	54	M	Lt	1.1	Conservative	NA	NA
Present study ^[17–20]	58	F	Lt	NA	Conservative	NA	NA
Present study ^[17–20]	62	F	Lt	1	Conservative	NA	NA
Present study ^[17–20]	56	F	Lt	NA	Conservative	NA	NA
Huang <i>et al.</i>	70	F	Lt	2.2	Conservative	NA	NA
Yang and Draganov ^[21]	81	M	Rt	6.6	Endoscopic diverticulectomy	None	NA
Present study ^[17–20]	76	F	Lt	NA	Conservative	NA	NA
Orzell <i>et al.</i> ^[12]	78	M	Rt	NA	Open diverticulectomy	None	NA
Our case	82	M	Lt	5.5	Open diverticulectomy	None	7

Reference of reported cases: Saisho *et al.*^[14] and Orzell *et al.*^[12].
 Bi, Bilateral; F, female; Lt, left; M, male; NA, not available; Rt, right.

of recurrent laryngeal nerve injury as this nerve entry point corresponds to the base of KJD; there is a risk of the transection and thermal damage. Few studies have been published regarding successful endoscopic treatment, including monopolar cautery and carbon dioxide laser to separate the intervening septum or an endoscopic stapler and needle knife to divide the septum^[21–23]. Diverticulopexy should be done in high-risk patients with previous neck surgery. Conventional diverticulectomy is the standard treatment as this restores the pharyngoesophageal anatomy and eliminates the possibility of carcinogenesis in the diverticulum. Although there is no reported case of malignant changes, Herbella *et al.*^[24] reported a prevalence of malignant transformation in ZD from 0.3 to 7%. After diverticulectomy of ZD, suture or staple line leakage has been reported in 1.7–12.7% of patients^[25]. Our case was very high risk because of old age, mitral valve repair, and permanent pacemaker dependency. The patient has hoarseness of voice, dysphagia for solids, and recent difficulty in breathing. Open diverticulectomy was performed safely, and the patient recovered fully.

Conclusion

In conclusion, we report a rare case of dysphagia and simultaneous hoarseness of voice in an octogenarian due to KJD, who was treated with open diverticulectomy, and dysphagia resolved;

he regained his voice back after 6 weeks. In our opinion, endoscopic surgery in such a patient with KJD can put recurrent laryngeal at risk of injury since an endoscopic approach operator cannot visualize and dissect away the recurrent laryngeal nerve, particularly when KJD already compresses it.

Ethical approval

IRB approval.

Patient consent

Written informed consent was obtained from the patients for the publication of this and the accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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None.

Author contribution

I.U.H.C.: senior operating surgeon and wrote the discussion section; A.M.A.G.: wrote the abstract; M.A.A.A.: searched references; Y.A.Q.: wrote the introduction section; T.A.: searched

references and helped in the revision; B.R.: searched references and wrote part of the discussion section; O.M.A.F.: assistant surgeon arranged the table and figures and wrote the highlights section.

Conflicts of interest disclosure

The authors declare that they have no financial conflicts of interest with regard to the content of this report.

Research registration unique identifying number (UIN)

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Provenance and peer review

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