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Case Report

Subglottic stenosis misdiagnosed as asthma: a case report

Dema Motter[1]*, Fatemeh Salimi[2]

[1]Grange University Hospital, Wales, United Kingdom
[2]University of Oxford, United Kingdom

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***Correspondence:**
Dr. Dema Motter,
E-mail: dema.4@hotmail.com

ABSTRACT

Idiopathic subglottic stenosis (ISGS) is a rare condition of unknown aetiology that is characterised by circumferential stenosis of the larynx and upper trachea. Subglottic stenosis can be congenital, acquired or iatrogenic. Acquired subglottic stenosis can occur as a result of infection, trauma, iatrogenic (post-intubation) or idiopathic. We report a patient with ISGS that was misdiagnosed with asthma. Subglottic stenosis was diagnosed after formal endoscopic evaluation and treated with balloon dilatation.

Keywords: ISGS, Subglottic stenosis, COVID-19, SGS

INTRODUCTION

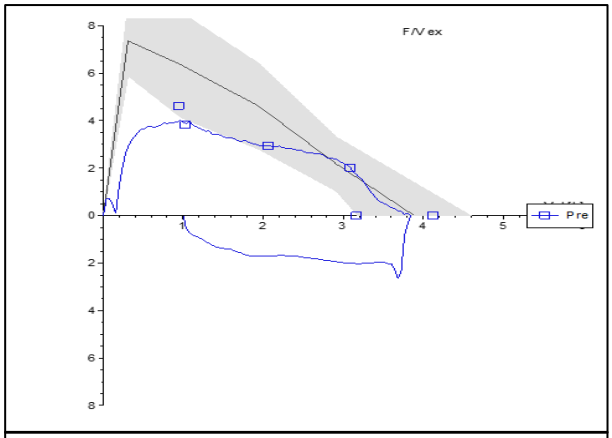
Idiopathic subglottic stenosis (ISGS) is a rare condition of unknown aetiology characterized by circumferential stenosis in the subglottic larynx and upper trachea.[1] ISGS can lead to life-threatening restriction in ventilation. Subglottic stenosis can be acquired, congenital or iatrogenic. ISGS is a diagnosis of exclusion. Management options depends on symptom severity. Conservative management can be adopted in asymptomatic patients, where monitoring is carried out with serial endoscopic evaluation of the upper airway. If patients develop severe symptoms such as stridor or severe airway compromise, surgery will be indicated. Surgical options include laryngo-tracheo-bronchoscopy and balloon dilatation of the stricture, endoscopic CO_2 laser excision of the subglottic scar tissue, tracheal resection and reconstruction and in refractory cases, surgical tracheostomy.

CASE REPORT

A 30-year-old female presented to the emergency department with complaints of worsening stridor and rapid deteriorating in her effort of breathing. She was initially diagnosed with acute exacerbation of asthma and was managed conservatively with adrenaline nebulisers, steroid therapy and oxygen support. A flexible fiberoptic rhino-pharyngo-laryngoscopy revealed normal pharyngeal and laryngeal anatomy with mobile vocal cords. Examination of the oral cavity and neck and chest were normal. She was initially diagnosed with asthma two years ago and was commenced on fluticasone with vilanterol inhaler, salbutamol, montelukast and ferritin. Despite medical therapy, her symptoms worsened over the last 12 months. She was otherwise fit and well with no known allergies. She had contracted COVID-19 infection prior to the onset of symptoms, but the course of infection was unremarkable.

She denied any history of previous trauma including intubation, tracheostomy or any systemic illnesses. She is a non-smoker, and currently works in a warehouse as part of a housekeeping team.

She was further investigated with a peak-flow spirometry and flow-volume loop, both of which indicated an upper airway obstructive picture (Figure 1). Autoimmune profile was negative.



Patient Position		Pre BD Sitting	% Pred	SR	Pred LL	Pred
Substance Dose						
PEF	L/min	278	62.9	-3.04	353	442
MEF 75	L/s	3.83	60.4	-1.86	4.13	6.35
MEF 50	L/s	2.95	64.1	-1.50	2.79	4.60
MEF 25	L/s	2.03	93.4	-0.21	1.03	2.17
MMEF 75/25	L/s	2.91	71.6	-1.35	2.66	4.06
VC MAX	L	4.12	104.4	0.41	3.26	3.95
FEV1	L	3.16	93.3	-0.60	2.76	3.39
FVC	L	4.12	105.9	0.54	3.18	3.89
VC MAX	L	4.12	104.4	0.41	3.26	3.95
FEV1% VC MAX	%	76.83	91.9	-1.04	72.88	83.59
FEV1% FVC	%	76.83	91.9	-1.04	72.88	83.59
FET	sec	2.86				

Figure 1: Pulmonary function report showing flattening of both expiratory and inspiratory flow loops and decreased PEFR

Despite being on maximal medical therapy, her symptoms failed to settle. She underwent a THRIVE (trans-nasal humidified rapid-insufflation ventilatory exchange) laryngo-tracheo-bronchoscopy, which revealed a grade 1 Cotton-Myer subglottic stenosis of 10 mm long and 5mm diameter over the two upper segments of the tracheal wall. The subglottic and tracheal stenosis was dilated with a 20 mm H_2O balloon. Post-operatively, her effort of breathing improved and her stridor settled.

DISCUSSION

Subglottic stenosis is defined as narrowing of the upper airway, which occurs between the vocal cords and the cricoid cartilage. Causes of subglottic stenosis can be congenital, acquired or iatrogenic.[2] Acquired subglottic stenosis can occur as a result of infection, trauma, iatrogenic or idiopathic.

Iatrogenic SGS, caused by intubation or tracheostomy, was first theorized in 1969, and thought to be the result of tracheal ischaemia due to high endotracheal cuff pressures compromising the mucosal blood flow, leading to subglottic scarring and fibrosis.[3,4] Subglottic stenosis can lead to life-threatening conditions such as reduced ventilation, and can lead to respiratory failure and death.

The degree of symptoms depends on the severity of the subglottic stenosis, however, patients often present with symptoms consistent with asthma, such as dyspnoea on exertion, cough, wheezing or biphasic stridor. Treatment of asthma is often commenced but patients usually fail to respond, thus it is imperative to obtain a thorough history for each patient presenting with respiratory complaints, as misdiagnosis can delay proper treatment. The diagnosis of subglottic stenosis is made with endoscopic evaluation of the subglottis and trachea. ISGS is a diagnosis of exclusion. Conditions such as gastro-oesophageal reflux disease, asthma, collagen vascular disease, relapsing polychondritis, scleroderma, polyarteritis, sarcoid and granulomatosis with polyangiitis must be ruled out.[1]

Investigations of subglottic stenosis includes pulmonary function tests, radiological assessment, and formal endoscopic evaluation of the upper airway.

Pulmonary function tests can assess lung volume, capacity, and rate of flow. Although pulmonary function tests are effort-dependant, they can provide information on upper airway flow, and highlight presence of upper airway obstruction. It can also provide important information to the anaesthetic team on perioperative morbidity and mortality risks.

Radiological evaluation such as computed tomography or magnetic resonance imaging can provide invaluable information on the location and length of the stenotic segment, and aid surgical planning.

Endoscopic examination remains the gold standard investigation for the diagnosis of subglottic stenosis. The grading system most commonly used, developed in 1994, is the Myer-Cotton system, which assesses the circumferential stenosis and grades as I-IV corresponds with 0-50%, 51-70%, 71-99%, and no detectable lumen, respectively.[5]

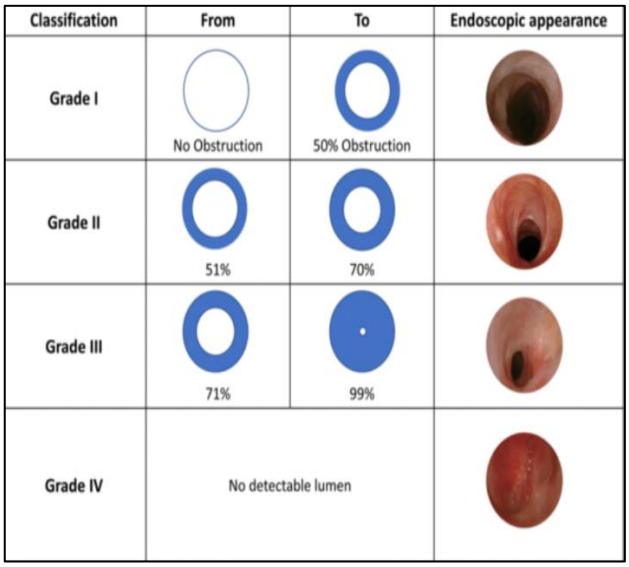


Figure 2: Myer-Cotton classification.[5]

The surgical management options of symptomatic patients with subglottic stenosis include endoscopic technique to dilate the stenosed segment or perform CO_2 laser and scar excision, open approach for laryngeal reconstruction, or in refractory cases, a permanent tracheostomy.

CONCLUSION

ISGS is a rare condition of unknown aetiology. Symptoms of ISGS can often be misinterpreted as features of asthma. ISGS is a diagnosis of exclusion, and should be considered when medical management for other conditions have failed.

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REFERENCES

1. Axtell AL, Mathisen DJ. Idiopathic subglottic stenosis: techniques and results. Ann Cardiothorac Surg. 2018;7(2):299-305.
2. Jagpal N, Shabbir N. Subglottic Stenosis. 2022. In: StatPearls. Treasure Island (FL): StatPearls Publishing. Available at: https://www.ncbi.nlm.nih.gov/books/NBK563265/. Accessed on 25 Oct, 2022.
3. Cooper JD, Grillo HC. The evolution of tracheal injury due to ventilatory assistance through cuffed tubes: a pathologic study. Ann Surg. 1969;169:334-48.
4. Pasick LJ, Anis MM, Rosow DE. An Updated Review of Subglottic Stenosis: Etiology, Evaluation, and Management. Curr Pulmonol Rep. 2022;11:29-38.
5. Myer CM 3rd, O'Connor DM, Cotton RT. Proposed grading system for subglottic stenosis based on endotracheal tube sizes. Ann Otol Rhinol Laryngol. 1994;103(4 Pt 1):319-23.

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