PST | PEDIATRIC SURGERY IN TROPICS

LONG-TERM CLINICAL FOLLOW-UP OF CHILDREN BORN WITH ESOPHAGEAL ATRESIA IN SUB-SAHARAN AFRICA.

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Keywords

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Abstract

Introduction: Esophageal atresia, previously perceived as predominantly a neonatal diagnosis associated with peri-operative morbidity, has evolved into a chronic condition distinguished by persistent issues throughout an individual's lifetime. This study aimed to identify specific domains that need to be integrated into a comprehensive long-term clinical follow-up for children born with EA in Sub-Saharan Africa.

Method: A prospective ambi-directional cohort study was undertaken that included all patients born with EA who received follow-up care in our unit from 2020 to 2024. The patient's age at the time of visit and the nature of the visit were documented. The collected clinical information was categorized into aspects related to feeding and nutritional status, gastrointestinal (GI) complaints, respiratory complaints, and findings derived from clinical examination.

Results: Eighty-seven study forms were completed during the study period. The median age at the time of follow-up was 32 months. 33%-49% cases documented feeding difficulties. Most patients aged 0-11 months had a weight-for-age below -2 or -3 SD, with 60% of older children exhibiting BMI

	measurements below these parameters. The most common GI symptoms experienced included gastroesophageal reflux (72%), dysphagia (43%), and food bolus obstruction (29%). 76% had recurrent respiratory tract infections, and 29% presented with a persistent cough. No skeletal abnormalities were observed. **Conclusion:** Our data highlights the significant impact of EA on the nutritional status, feeding patterns, GI, and respiratory systems of affected children in a center in Sub-Saharan Africa. Our results underscore the necessity of their inclusion in the long-term clinical follow-up of EA patients in resource-restricted environments.
Abbreviations	**BMI:** Body mass index **CPD:** Chronic pulmonary diseases **EA:** Esophageal atresia **ESPGHAN/NASPAGHAN:** The European Society for Paediatric Gastroenterology, Hepatology and Nutrition and North American Society for Pediatric Gastroenterology, Hepatology & Nutrition **GER:** Gastroesophageal reflux **GI:** Gastrointestinal **INoEA:** International network of EA **MDT:** Multidisciplinary team **PPI:** Proton pump inhibitor **PTB:** Pulmonary tuberculosis **RTI:** Respiratory tract infection **TEF:** Tracheoesophageal fistula **WHO:** World Health Organization

INTRODUCTION

Esophageal atresia (EA) is a congenital aerodigestive disease with a global incidence of 1 in 2500 to 3000 neonates, giving rise to significant long-term complications.[1,2] These complications stem from both the inherent anatomical defect and the subsequent corrective surgery, collectively manifesting in gastrointestinal (GI), nutritional, and respiratory morbidity, as well as deformities of the spine, all of which can have a long-term impact on EA patients.[3] Previously perceived as predominantly a neonatal diagnosis associated with peri-operative morbidity, EA has undergone a transformative evolution into a chronic condition distinguished by enduring and persistent issues throughout an individual's lifetime.[4]

The GI system contributes to a substantial burden among these complications, with dysphagia, esophageal dysmotility, and gastroesophageal reflux (GER) being the prevailing clinical manifestations. [5] Dysphagia in EA patients arise due to abnormal esophageal peristalsis and may be exacerbated by strictures at the anastomotic site as well as GER. [6] Consequently,

affected individuals may exhibit meal refusal, incomplete food intake, vomiting, and episodes of coughing and/or choking during or after feeds, ultimately impacting both their feeding patterns and their overall nutritional status. [7] In addition, feeding difficulties are traumatic experiences for some of these families, affecting both the quality of life of these children and the emotional well-being of the parents caring for them. [8-10]

Simultaneously, the respiratory system is frequently affected, resulting in chronic morbidity characterized by recurrent respiratory tract infections (RTI), wheezing, and persistent coughing. [11,12] Chronic aspiration, stemming from GI morbidities, further exacerbates respiratory distress, leading to severe chronic respiratory morbidity. Additionally, these patients may develop atopy and asthma, which can be attributed to alterations in their altered GI mucosal immunity. [11] Tracheomalacia is a specific respiratory morbidity present in 90% of EA children. [13] It is defined as any degree of tracheal collapse during exhalation with a typical barking cough. [13,14] In severe cases, tracheomalacia can lead to acute life-threatening events and recurrent respiratory tract infections due to decreased airway clearance. [14]

The primary objective of this study was to identify specific domains that need to be integrated into a comprehensive long-term clinical follow-up for children born with EA in an academic unit in Sub-Saharan Africa.

METHOD

A prospective cohort study was undertaken that included all patients born with EA who received follow-up care at our healthcare facility from 2020 to 2024. The minimum age for clinical follow-up was 1-month post-surgery. All parents and, where applicable, patients themselves provided informed consent or assent. Patients who were lost to follow-up, those who passed away before the first follow-up or before the commencement of the study period, and patients who declined consent or assent were excluded.

Clinical data were extracted from hospital records and included antenatal, neonatal, and postnatal demographics as well as comprehensive details regarding surgical interventions.

Questions from various long-term EA follow-up studies were amalgamated to develop a comprehensive study questionnaire/case report form. Members of the surgical team

prospectively administered the questionnaire during the predefined study period. These questions were asked in an interview-based format during routine patient visits and/or elective and emergency admissions to our healthcare unit. Pertinent data, including the age of the patient at the time of the visit and the nature of the visit, were documented. The collected clinical information was categorized into four parts**:** 1) aspects related to feeding and nutritional status, 2) GI complaints, 3) Respiratory complaints, and 4) findings derived from clinical examination.

Feeding history and anthropology

Questions pertaining to the patient's current feeding symptoms during the follow-up were tailored according to the patient's age, distinguishing between neonates and infants who primarily received milk feeds and older patients who had transitioned to solid foods. Clinical examination included measurement of height and weight, which were plotted on the World Health Organization (WHO) Anthro Plus gender-specific growth charts. [(15)]

GI Symptoms

The second section consisted of questions aimed at eliciting the patient's current GI symptoms. Particular attention was directed toward common GI manifestations often associated with EA, such as dysphagia and odynophagia, GER, symptoms associated with food bolus obstructions as well as other symptoms suggestive of esophageal stricture. In cases where clinical indications existed further diagnostic investigations, including but not limited to endoscopy, contrast swallow studies, and milk scans, were performed.

Respiratory symptoms

This section evaluated the patient's respiratory complaints. Specific enquiries were directed toward identifying the presence of a persistent cough, recurrent RTI, a diagnosis of chronic pulmonary disease, doctor-diagnosed asthma, any historical diagnosis or treatment of pulmonary tuberculosis (PTB), as well as exercise tolerance as perceived by the parent or patient answering the questions. A persistent cough was defined as being present more days than not during the month prior to follow-up. We further asked if this cough was bark-like and had any impact on the child's daily life, all symptoms indicative of tracheomalacia. Patients were referred for chest radiographs when clinical indications were apparent.

For children aged five years and older who could cooperate, lung function tests were arranged, adhering to the guidelines set out by the European Respiratory Society (ERS). [16] These tests specifically included an assessment of flow-volume loops and reversibility analysis to identify potential restrictive lung disease or lung function abnormalities. [16]

Clinical examination

The last section of the study was a comprehensive clinical examination of the patient. This included an evaluation of any abnormalities that might have arisen secondary to the initial thoracotomy, such as shoulder asymmetry or a winged scapula. A thorough examination of the respiratory and GI system was performed, including documentation of any discernible scars related to the patient's medical history.

Statistical analysis

Descriptive data included medians and interquartile ranges or means and standard deviations to gauge central tendencies and dispersions, as well as the calculation of numerical counts and percentages for categorical data, were performed as appropriate.

RESULTS

Twenty-two patients born with EA met the inclusion criteria and were followed during the study period (2020 – 2024). The patients were born at a mean gestational age of 36 ± 3 weeks, with a corresponding birth weight of 2387 ± 687 grams. The majority (n=14, 64%) of these patients were male, and most (n=13, 59%) were born at peripheral hospitals and transferred to our facility. Fourteen (64%) mothers underwent antenatal ultrasound during their pregnancy. Notably, 3 (21%) of these ultrasounds revealed polyhydramnios.

Nine (41%) patients exhibited associated anomalies, of which 8 (36%) were diagnosed with VACTERL (vertebral, anorectal, cardiac, tracheo-esophageal (TEF), renal and limb) anomalies, and one (5%) was diagnosed with a chromosomal abnormality.

Most of our patients (n= 19, 86%) were born with an EA with distal TEF, while the remaining 3 cases (14%) exhibited isolated EA. Seven (32%) were identified as having a long gap EA, as documented by the surgeon during the initial diagnosis. Sixteen (73%) patients underwent primary surgical repair, and 4 (18%) patients had delayed surgical interventions, whereas in 2 (9%), no conventional repair measures were undertaken, and esophageal replacement surgery was pursued at a later juncture. Seven (32%) patients required a gastrostomy and/or esophagostomy at some point before their scheduled follow-up assessment.

Prospective long-term follow-up/completion of case report forms

Eighty-seven case report forms were completed for the 22 patients included in our cohort. The median age at the time of follow-up was 32 months, encompassing a range of 1 month to 16 years. Most patient encounters (55%) occurred during routine appointments at the out-patient department. The remaining (45%) occurred during admissions to the pediatric surgical ward, primarily in association with various elective medical procedures such as endoscopic procedures or radiological examinations.

Feeding history and anthropology

Concerning feeding history, most older children (56%) reported to enjoy the same food as the rest of the family. Some of the parents reported certain dietary modifications, such as avoiding meat or finely chopping their children's food. In more than half of the reports (59%), there were no complaints about unusual delays in the completion of meals. Thirty-three percent reported occasional reluctance to finish meals, 49% reported incidents of coughing or choking episodes during feeding, and 34% reported episodes of vomiting either during or after feeds.

In terms of anthropometric parameters, the weight, height, and, where appropriate, body mass index (BMI) was recorded in the different age groups. (Table 1) Weight-for-age and height-for-age for children 0-60 months were plotted on age- and gender-appropriate graphs. (Table 2) BMI-for-age was plotted for patients aged 5-19 years. (Table 3) For all patients, weight, height, and BMI values were compared to the mean using Z-scores, categorized as those with measurements <-3SD and<-2SD. (Tables 2 and 3) This analysis incorporated all children with plausible z-scores, encompassing a total of 57 cases aged less than 60 months and 30 cases aged 61 months and older.

	Weight (kg)	Height (cm)
Age (months)	**Median (IQR 25 - 75)**	**Median (IQR 25-75)**
0-5 (n=15)	4 (3 – 6)	54 (50 – 59)
6-11 (n=10)	7 (6 – 7)	63 (27 – 69)
12-23 (n=11)	11 (9 – 13)	78 (77 – 82)
24-35 (n=9)	12 (11 – 14)	91 (85 – 93)
36-47 (n=10)	13 (12 – 16)	95 (93 – 98)
48-60 (n=2)	16	101
61-119 (n=15)	9 (4 – 14)	122 (114 – 125)
120-179 (n=14)	12 (6 – 14)	138 (136 – 141)
180-228 (n=1)	9.5	136

Table 1. Anthropometry for our cohort

IQR: Interquartile range, kg: kilogram, cm: centimeter, BMI: Body mass index

Table 2. Nutritional status of children aged 0-60 months

IQR: Interquartile Range, SD: Standard deviations

* Values are based on WHO standards (birth to 60 months)

Nutritional status of children (61 months – 19 years) *										
	Weight-for-age**			**Height/Length-for-age**			**BMI-for-age****			
Age (months)	**<-3SD**	**<-2SD**	**Median IQR (25-75)**	**<-3SD**	**<-2SD**	**Median IQR (25-75)**	**<-3SD**	**<-2SD**	**<+1SD**	**Median IQR (25-75)**
	%	%		%	%		%	%	%	
61-119	13	20	-0.7 (-2.7 to -0.01)	0	7	-0.5 (-1.36 to 0.01)	13	13	0	-1.4 (-2.8 to -0.2)
120-179	N/A			0	21	-1.3 (-2.3 to -0.5)	40	20	0	-2.2 (-3.6 to -1.2)

Nutritional status of children (0-60 months) *						
	Weight-for-age			**Height-for-age**		
Age (months)	**< -3SD**	**< -2SD**	**Median (IQR 25-75)**	**< -3SD**	**< -2SD**	**Median (IQR 25-75)**
	%	%		%	%	
0-5	47	7	-2.6 (-4.1 to -1.1)	7	0	-1.8 (-3.9 to -1)
6-11	20	50	-2.4 (-2.6 to -1.9)	20	10	-2.5 (-8.6 to 0.2)
12-23	9	0	-0.05 (-0.9 to 0.7)	0	0	-0.91 (-1.4 to 0.18)
24-35	0	0	-0.6 (-1.38 to 0.2)	0	0	-0.06 (-0.97 to 0.46)
36-47	0	0	-1 (-1.3 to 0.3)	0	0	-0.7 (-1 to -0.3)
48-60 (n=2)	0	0	-0,02	0	0	-0.6

180-228	N/A			100	0	-3.91	0	0	0	-1.46

Table 3. Nutritional status of children aged 61-228 months

IQR: Interquartile Range, SD: Standard deviations, BMI: Body Mass Index, N/A: Not applicable

*Values are based on WHO reference 2007 (61 months to 19 years)

**Weight-for-age reference data are not available beyond 10 years, and BMI was used for these children as per WHO guidelines

Gastrointestinal history, symptoms, and examination

In most instances (72%), children had experienced symptoms related to GER. Notably, among these patients, six individuals had undergone anti-reflux procedures. Most follow-up cases (83%) documented using proton pump inhibitors (PPIs). Twenty-nine percent of patients had reported experiencing food bolus obstruction at least once within the year leading up to their documented follow-up. The majority (59%) of children disclosed a habit of consuming fluids during and after meals. A summary of the remaining GI symptoms is provided in Figure 1.

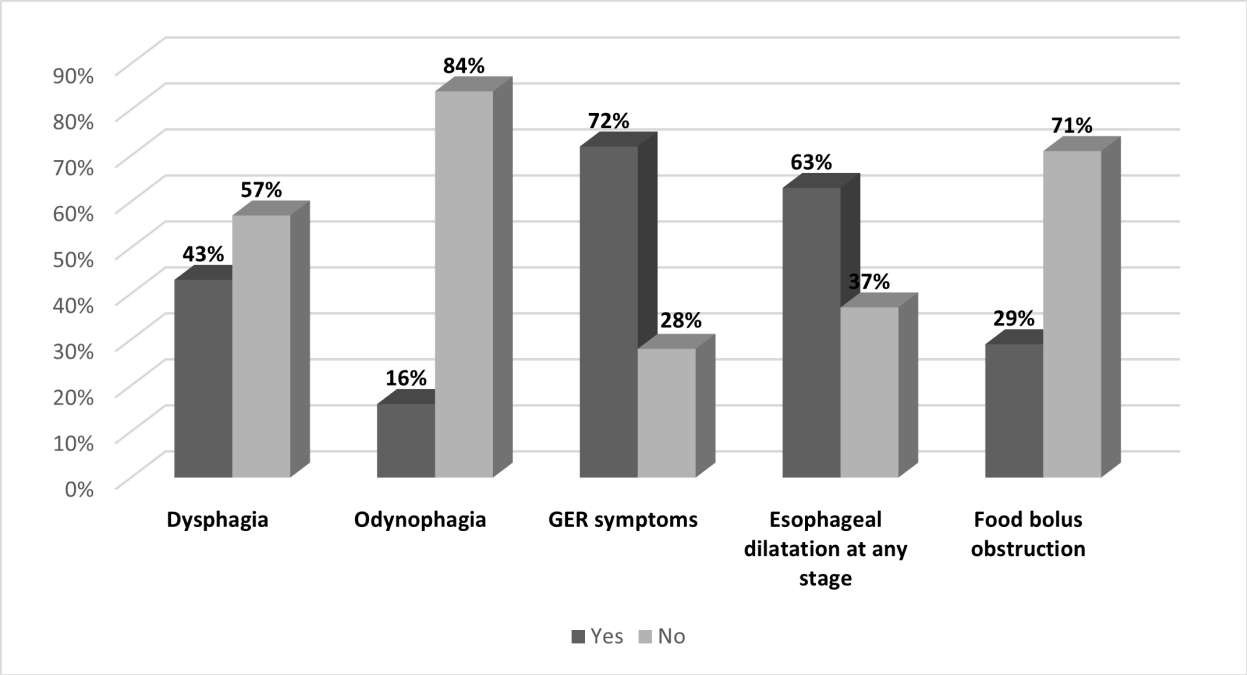

Fig 1. Common gastrointestinal complaints documented

Nearly all the GI system examinations (98%) were reported as unremarkable during the patient's visit, with abnormal only detected in 2% of cases. One patient presented with an unspecified hernia, and another exhibited tenderness in the epigastric region. All surgical scars were fully healed, with no wound infections or wound dehiscence documented.

Contrast meal studies were conducted during 9% of visits, primarily aimed at further investigation of symptoms suggestive of esophageal strictures, such as dysphagia or a history of a food bolus impaction. These symptoms were present in 7% of cases. The remaining 2% presented with symptoms suggestive of GER. Among these studies, findings revealed narrowing at the anastomotic site without hold-up of contrast in 3%, while 1% exhibited normal results. One patient underwent two separate studies, both revealing a diverticulum post-Livaditis myotomy, and 2 exhibited severe GER.

In response to these findings, appropriate therapeutic interventions were initiated for all patients, and arrangements were made for endoscopy as indicated, with subsequent follow-up visits scheduled as necessary.

Respiratory symptoms, examinations, and lung function tests

Regarding respiratory symptoms, examinations, and lung function assessments, most cases (76%) reported hospitalization for respiratory tract infections (RTIs) at least once in the year preceding the documented visit. Nine percent required out-patient treatment for RTIs on two or more occasions, while 31% had less frequent RTI episodes in the year leading up to the visit. Sixteen percent of cases were diagnosed with chronic pulmonary disease (CPD) by a pediatric pulmonologist, 93% of which were prescribed prophylactic antibiotics. In total, 45% of cases received medical attention from pulmonologists on at least one occasion. The most prevalent respiratory symptoms are presented in Figure 2.

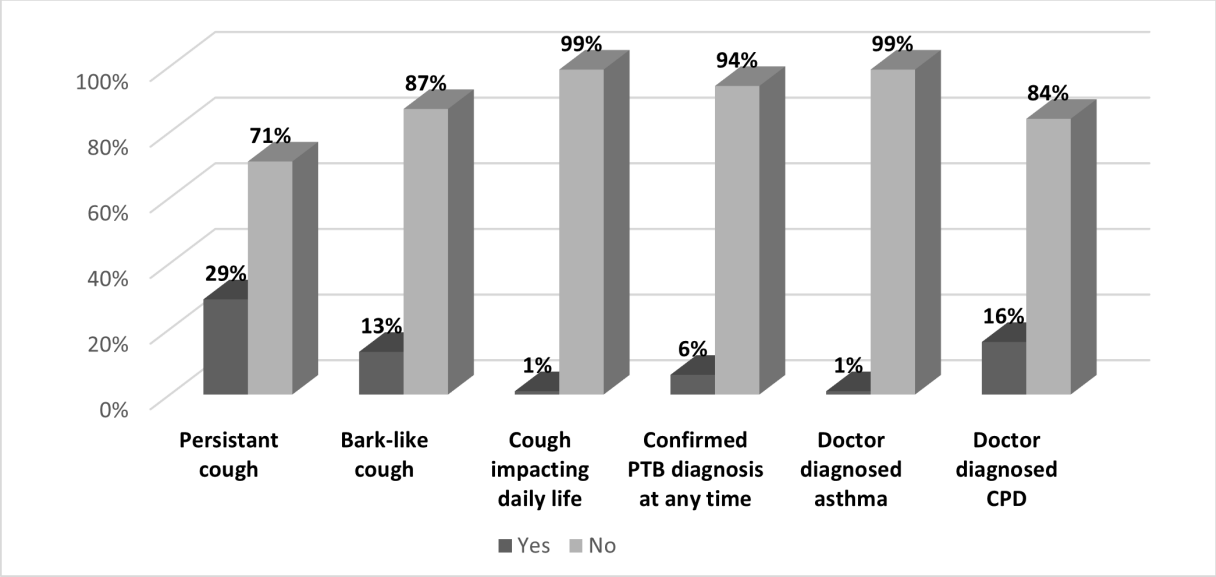

Fig 2. Common respiratory complaints

Ten patients received a diagnosis of tracheomalacia, as visualized on bronchoscopy, during the neonatal period. A persistent cough was present in 29% of patients during follow-up, with characteristics typical of tracheomalacia.

A subset of the cohort, comprising 31%, had reached an age where participation in sports was possible. However, most of these children (52% of this subgroup) had opted not to engage in sports activities. Their reasons for abstaining from sports were evenly divided, half of them expressing disinterest in sports, while the remaining half cited easy fatigability. The remaining 48% of this subgroup regularly participated in sports at school, which included a variety of activities such as wrestling, ball sports, cycling, and athletics.

All patients had a complete respiratory system examination during their visit, which yielded no anomalies in the majority (84%) of cases. A subset of patients did, however, manifest abnormal respiratory signs, which included wheezing, respiratory distress necessitating hospital admission, and unilateral decreased air entry in one instance, a patient who was admitted and later diagnosed with PTB. Chest radiographs were obtained in 13% of cases, predominantly among those with concurrent abnormal respiratory system examinations. Findings visible on chest radiographs included signs suggestive of PTB, aspiration pneumonia, lower respiratory tract infection, and the presence of foreign bodies lodged in the esophagus on two occasions. Where deemed necessary, patients were referred to pulmonology for further diagnostic work-up and treatment.

Only 3 lung function tests were performed for two patients during the study period. These tests consistently revealed a restrictive pattern, with one patient demonstrating a responsive improvement following bronchodilator administration. It is essential to acknowledge that a significant portion of the study coincided with the COVID-19 pandemic, rendering this aspect of the study protocol inaccessible to most of our patients.

Skeletal abnormalities

Potential skeletal abnormalities, including shoulder asymmetry, a winged scapula, or scoliosis, were clinically assessed, and systematically documented. None of the cases within our cohort exhibited any abnormalities attributed to the original thoracotomy procedure.

DISCUSSION

In our study, GI complaints, especially those related to dysphagia and GER, were common. Recurrent RTI was present in most of our cohort with a low incidence of a persistent and/or bark-like cough reported. No orthopedic abnormalities nor complications from scars associated with the original EA-surgery were reported in any of our cases.

EA is the most prevalent congenital aerodigestive abnormality. [4] The absence of a systematic approach to EA patient's long-term follow-up prompted the establishment of the International Network of EA (INoEA) in 2013.[4] This INoEA working group included members of The European Society for Pediatric Gastroenterology, Hepatology and Nutrition and North American Society for Pediatric Gastroenterology, Hepatology & Nutrition (ESPGHAN/NASPAGHAN) who were tasked with formulating clinical practice guidelines focusing on nutrition and GI symptoms of EA patients .[4] An early systematic review by Connor et al. identified enduring long-term morbidity in EA patients. It revealed a spectrum of GI and respiratory issues, underscoring the need for developing an effective long-term follow-up program for this disease. [5] This sentiment was echoed by Almog et al., who identified GER, esophagitis, dysphagia, tracheomalacia, vocal cord disorders, and risk for esophageal malignancy as potential long-term complications. [13]

Patients with EA frequently struggle with feeding difficulties, predominantly stemming from esophageal and oropharyngeal dysphagia. [17] Early studies, such as the work by Puntis et al. in 1990, indicated that EA patients exhibited a higher propensity for feeding difficulties,

specifically meal refusal, slower eating, and choking, or vomiting during meals when compared with their healthy counterparts. [7] Chetcuti et al. corroborated these findings, noting an age-related improvement in these difficulties, with less than 10% of patients older than 15 still struggling with such issues. [18] In our study, less than half of cases reported extended mealtimes and experienced choking or coughing during feeds. This is lower than reported by Schier et al., who noted that 68% of their 128 patients experienced feeding difficulties characterized by symptoms such as pain, regurgitation, vomiting, and burping. [19] This also contrasts with our study, where most parents of older children reported that their children consumed the same food as the rest of the family. Stewart et al. highlighted that feeding times for families have the potential to be traumatizing, anxiety inducing, isolating, and a time of uncertainty, an aspect that should be considered when inquiring about feeding-related symptoms. [10]

GI morbidity, particularly esophageal dysmotility, GER, and strictures, frequently manifest in EA patients following surgical repair. [20] Connor et al. identified dysphagia and GER as some of the most common long-term GI morbidities, with pooled prevalence rates of 50,3% and 40,2%, respectively. [5] In our study, 43% of cases reported symptoms of dysphagia, with 29% indicating instances of food bolus impaction in the year prior to the visit. These figures align closely with the reported 38% by Schier et al., suggesting consistency across studies. [19] The etiology of dysphagia in EA patients can often be attributed to abnormal esophageal development leading to altered esophageal peristalsis, a finding supported by studies employing esophageal manometry. [5] These manometry studies have been able to demonstrate weak or absent peristalsis with impaired contraction patterns explaining the dysphagia. [13] A study by Coppens et al. did, however, show that the prevalence of dysphagia seemed to decrease with age, from 55% in patients <1 year to 21% in older children (aged 12-18 years). [21] This highlights the continued need to follow these patients up, paying particular attention to the different morbidities that can present at different ages.

Literature reflects that GER is the most prevalent long-term morbidity in EA patients, affecting up to 75% of children born with EA. [1] The findings of the present study are in keeping with these figures, as evidenced by the with 83% of our cohort that presented with GER symptoms. The underlying causes of GER in this population include tension at the anastomosis during repair, aberrant esophageal motility, and abnormal gastric myoelectrical activity. [1] Managing GER is crucial to alleviate immediate symptoms and prevent potential long-term complications, including Barrett's esophagus, eosinophilic esophagitis, and eventual esophageal epithelial metaplasia. [1,5] Koziarkiewicz et al. diagnosed pathological GER in 50% of their patients 3-4

months post-surgery. [3] Few patients in our cohort underwent Nissen fundoplication in contrast to the 18.6% reported by Cartabuke et al., with the majority (83%) opting for medical management with PPIs. [20] Our management aligns with the ESPGHAN/NASPAGHAN guidelines, which recommend PPIs as the primary treatment for GER in EA patients for the first year of life and continued as required for recurrent symptoms. [4]

Underlying GER is often associated with esophageal strictures. Almog et al. reported an incidence in the literature ranging from 10% to 59%, with tension on the anastomosis, an anastomotic leak, and GER identified as common risk factors for the development of strictures. [13] In our cohort, nearly two-thirds reported at least one dilation, which is in keeping with findings in the literature. According to the ESPGHAN/NASPAGHAN guidelines, routine screening for anastomotic strictures is discouraged. [4] The guidelines recommend a symptom-based approach to follow-up and propose considering the possibility of strictures only in cases where patients are unable to achieve feeding milestones. [4] In our study cohort, all patients who exhibited severe or worsening dysphagia underwent either endoscopy or contrast studies to identify potential strictures and subsequently received dilatations when deemed necessary. We did not include endoscopic surveillance in this study; this aspect has been addressed in a separate investigation being conducted at our institution. Nonetheless, we underscore the importance of endoscopic surveillance in the ongoing long-term care of EA patients.

The respiratory system is a commonly affected domain in EA patients and warrants thorough consideration in long-term healthcare management. [20] Factors such as aspiration, dysphagia, strictures, and GER contribute to the development of chronic pulmonary conditions in this patient population. [20] The systematic review by Connor et al., encompassing six studies, determined that recurrent RTIs, doctor-diagnosed asthma, persistent coughing, and wheezing were prevalent as long-term respiratory morbidity in EA patients. [5] Notably, only one case in our cohort presented with doctor-diagnosed asthma. Kovesi et al. proposed the possibility that EA patients might be at risk for the development of asthma and atopy. [11] Forty-one of the 101 EA adults included in a study by Sistonen et al. had a positive bronchial hyperresponsiveness reaction, 15 of which were consistent with an asthma diagnosis. [22] Three children in our cohort were diagnosed and treated for PTB at some stage during their lives. PTB is an extremely common cause of respiratory symptoms in the Sub-Saharan African context, and there exists a need for investigation into PTB as a co-morbid entity in patients with EA.

EA patients frequently present with persistent structural anomalies within the trachea and bronchi that persist following EA repair. [13] Tracheomalacia contributes to recurrent pneumonia due to ineffective clearance of secretions. [21] Patients with tracheomalacia typically manifest distinctive symptoms characterized by a bark-like or seal-like cough, a phenomenon reported in up to 78% of EA patients. [5] Tracheomalacia usually improves with age, but those children with severe symptoms, including cyanotic spells, apnea attacks, and recurrent RTI, may require treatment. [13] Cartabuke et al. reported a high number of patients diagnosed with tracheomalacia in 86.7% of their cohort. [20] Their figures are significantly higher than the prevalence observed in our cohort, underscoring the necessity for more extensive multicenter investigations in this regard, specifically investigating the prevalence and impact of tracheomalacia in Sub-Saharan Africa.

It is imperative to consider shoulder asymmetry as a potential long-term complication arising from the original thoracotomy, given its reported occurrence in up to 80% of cases within the literature. [5] Koziarkiewicz et al. reported findings of shoulder asymmetry and a winged scapula in 11 of their 30 children, scoliosis in 20 children, and isolated chest deformities in 3 patients. [3] At our center, we employ a transverse incision inferior to the tip of the scapula and strive to minimize muscle cutting. Given that most of our cohort remains young, ongoing follow-up is crucial for a comprehensive evaluation of potential skeletal complications.

To effectively monitor both clinical symptoms and assess treatment responses, implementing long-term follow-up protocols for EA patients is highly recommended. [20] Koziarkiewicz et al. highlighted the potential benefits of regular multidisciplinary team (MDT) follow-up visits for this patient population. [3] This perspective was echoed and emphasized by the ESPGHAN/NASPAGHAN GI working group in 2016, emphasizing the need to consider this approach, particularly in resource-constrained environments, where the impact on work, income, and school attendance necessitates further exploration. [4]

CONCLUSION

Our data demonstrates the significant impact of EA on the nutritional status, feeding patterns, GI, and respiratory systems of affected children in a center in Sub-Saharan Africa. This confirms the importance of including appropriate surveillance and interventional measures in the long-term follow-up plans of EA patients, especially in resource-restricted environments. In line with established practices at specialist medical centers, it is advisable to establish MDTs dedicated to the comprehensive management of EA patients. This strategy aims to mitigate the need for and

potentially decrease the frequency of hospital visits and improve the healthcare experience for patients. It is essential to acknowledge the need for further research, particularly in poorly resourced environments, to evaluate and expand the impact of these multidisciplinary teams.

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