ESOPHAGEAL CARCINOMA IN A 15-YEAR-OLD GIRL: A CASE REPORT AND REVIEW OF THE LITERATURE

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Esophageal malignancies are commonly seen in the sixth, seventh, and eighth decades of life, and are rare at a young age and in children.[1] To date, only a few cases of esophageal carcinoma in children have been reported in the world literature.[2] Epidemiological studies have shown that these esophageal malignancies are predominantly environment-produced, and require a long, latent period of carcinogenesis, thus accounting for its rarity in childhood.[3-7] There is no mention of etiological or environmental risk factors in the majority of these reported cases, and therefore, the pathogenesis of the condition is still unknown. A case of esophageal carcinoma in a 15-year-old girl is reported because of its rare incidence in this teenage group. A brief review of the literature is also provided. We believe that this is the first case of its kind to be reported from the Middle East.

Case Report

A 15-year-old Sudanese female presented to the Gastroenterology Clinic of King Fahad Hospital, Medina, for progressively increasing dysphagia over a one-month period. The problem started with difficulty in swallowing solid food, and a feeling of food getting "stuck" in the retrosternal region. Initially, she could wash down the food with liquids. However, in a matter of only four weeks, she could not even swallow liquids without difficulty. Limitation in her oral intake resulted in weight loss. There was some chest discomfort, however, the swallowing was not painful. There was an associated feeling of ill health and lack of appetite. The patient had lived in Saudi Arabia for eight years, and had been in excellent health without any prior sickness. There had never been any previous swallowing problem. She denied having any chest pain, heartburn, regurgitation, nausea or vomiting, and there was no history of ingestion of any corrosive substance. She was not on any medications, such as antibiotics, NSAIDs, etc. She had no skin disease, had never smoked cigarettes or taken alcohol. She also denied drinking excessive "hot" coffee or tea, but admitted to occasionally taking soft drinks. There was no family history of esophageal problems or gastrointestinal malignancies, and there was no known familial or genetic disorder.

Physical examination revealed a thinly built, apprehensive girl. There were no signs of chronic sickness. Her vital signs were stable, BP 110/80 mm Hg and pulse 70/minute. There was no icterus and skin was normal. There was no keratinization of her palms or soles to suggest tylosis. There were no signs to suggest nutritional deficiencies. The neck was supple, and there were no palpable lymph nodes. Examination of heart, lungs and abdomen were unremarkable. Liver was not enlarged and there was no ascites.

Laboratory investigations showed hemoglobin of 14.5 g/dL, and normal WBC and platelet count. Urea, creatinine, electrolytes and liver enzymes, including alkaline phosphatase, were normal. Amylase was also normal, and chest x-ray was within normal limits.

A barium swallow revealed an ulcerated mass about 7 cm in length located in the lower esophagus. The gastro-esophageal junction and stomach were not involved. Upper endoscopic examination confirmed a fungating tumor in the lower third of the esophagus obstructing the lumen. Biopsies revealed a well-differentiated squamous cell carcinoma. CT scan of the chest and abdomen failed to reveal any distant metastases. The mass involving the lower esophagus was confined to the esophagus. MRI raised the possibility of a left atrial involvement, but an echocardiogram showed a normal uninvolved heart. Endoscopic ultrasound was not available. Facilities for radiation therapy were not available in our hospital, and the patient and family were reluctant to travel to another institution or country. She was prepared for esophageal resection.

At surgery, a large tumor measuring about 7 cm in length at the junction of the middle and lower third of the esophagus was found. The tumor was adherent to the pericardium, however, there was no true invasion of the pericardium. An enlarged lymph node was noted in the vicinity of the tumor posteriorly, loosely adherent to surrounding structures. The growth was separable from the surrounding adherence of pericardium. The abdomen was opened first, and after mobilizing the esophagus, a tube was inserted into the stomach. This was brought to the thoracic cavity. A right posterolateral thoracotomy was performed, as this allowed us enough space for a higher level of resection. The esophagus was transected at about 8 cm

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above the upper margin of the tumor. The fundus of the stomach was included in the resection and the entire specimen was removed en bloc. Esophagogastric end-to-side anastomosis was done, employing the hand-sewn two-layer method, and using vicryl 00 for all inner layers, and interrupted 00 silk for the outer layers. Staplers were not available in our operation room.

There were no findings to suggest metastatic spread, and no local or regional extension was noted. The perioperative period was smooth. A gastrografin study was performed on the eighth postoperative day. There was no leak from the anastomosis and the patient was discharged on the 11th postoperative day, being able to tolerate solid diet without difficulty. Histopathology of the resected specimen confirmed a well-differentiated squamous cell carcinoma infiltrating all layers of the esophagus. The resection margins were free of tumor. No evidence of malignancy was found in the lymph node.

Nine months after surgery, the patient presented again with increasing dysphagia. A barium meal revealed stricture at the site of anastomosis. EGD showed a tight stricture at the anastomotic site, which was dilated using TTS balloon dilators. No evidence of recurrent disease was found. She was progressively dilated to 56 F with resolution of her symptoms. At her last follow-up and investigations, she was doing well, with no evidence of local recurrence or metastatic disease.

Discussion

Malignancies in general and gastrointestinal malignancies in particular are uncommon in children. Gastric[8-10] or colorectal carcinomas occur in patients in the second and third decades of life.[11-13] The malignancy gradient of the alimentary tract cancer increases as it ascends from the colon to the esophagus.[14] The incidence of esophageal carcinoma is about 3.5/100,000 population. Esophageal carcinoma is considered a malignancy of adults mainly in the sixth or seventh decade of life. The incidence is at its maximum between the ages of 35 and 64 years, and is rare in the younger age groups.[15] In children, esophageal carcinoma is extremely rare. A national survey conducted in the USA during 1952-1956 reported only three deaths from esophageal tumors in the age group of 0-14 years, while a comparable series from England did not report such a number of deaths.[16] As well, no such cases were reported during a cancer survey of 1969-1971 and SEER program in 1976.[17] Even reports from high endemic areas like China and Iran, where the incidence of esophageal carcinoma is among the highest and the disease is known to present at a relatively early age, do not mention any childhood incidence of the condition.[18]

While reviewing the literature on 48 cases of squamous cell carcinoma in children, Moore reported only one case of primary esophageal carcinoma in a 14-year-old boy in 1958.[19] However, details of the patient's condition were not reported. In 1968, a well-differentiated squamous cell carcinoma of the upper esophagus occurring in a 15-year-old year Korean boy was reported by Kinnman et al.[20] This patient had a significant past history of accidental lye ingestion at three years age, followed by varying degrees of dysphagia. The tissue diagnosis was made in this patient at autopsy as the patient had succumbed to respiratory failure.

The youngest patient reported so far was an eight-year-old girl from India with esophageal carcinoma in the middle third of the esophagus with lung metastases in 1980.[21] Another case of well-differentiated carcinoma of the upper esophagus in a 14-year-old Indian boy was reported by Shahi et al. in 1989.[2] Ours is the first case that was treated by surgery with curative intentions with an excellent postoperative follow-up by endoscopy, radiological and biochemical investigations

Carcinoma of the esophagus is commonly seen in certain areas of the world, such as Central Asia, some areas in China, South Africa,[3,22,23] Kashmir,[24,25] and Iran.[26] It is one of the leading causes of death in these regions. The difference in rates between high- and low-risk areas and the dramatic diversity of incidence even within these discrete geographical areas between the sexes and among various ethnic groups suggests a predominant role for environmental factors in esophageal carcinogenesis. A general background status of nutritional deficiencies, either due to chronic alcohol abuse, poverty and/or lack of adequate food supply often co-exists. Carcinogens may be derived from tobacco, consumption of moldy foods, excessive use of particular spices, or certain food specialities in different cultures. The prevalence of disease was also found to be positively associated with the consumption of extremely hot beverages, prevalence of esophagitis among siblings, family history of esophageal cancer and use of cottonseed oil.[27] The other premalignant conditions of esophageal carcinoma are tylosis, achalasia, esophageal diverticula, lye stricture, and Plummer-Vinson syndrome. Of the different etiological factors mentioned in the literature, the habit of placing tobacco under the tongue or in the labiodental groove has been associated with a high incidence of oral and esophageal cancer, as has been reported from Sudan.[28] The most common age of presentation in all these was between 50 and 69 years. We could not find any such environmental or familial risk factor or premalignant condition in our case.

After scanning the literature, there appear to be only a few cases of esophageal carcinoma in children reported so far.[2,29] The rarity of esophageal malignancies in children may be due to the fact that these tumors are predominantly produced by environment, which requires long latent periods of at least 15-20 years to manifest as carcinomas.[4-7,29] On the basis of postmortem studies and mass screening surveys conducted in high-risk areas in different parts of the world, dysplasia has been postulated to be a precancerous lesion of the esophagus, which in turn is considered to be preceded by chronic esophagitis.[5,30]

Usually, children do not go into long enough periods of chronic esophagitis to reach a state of dysplasia. Studies in populations at high risk and low risk for esophageal cancer in China/Kashmir suggested that nutritional deficiencies such as low levels of riboflavin, retinol and zinc, exposure to N-nitrosamines, and fungal contamination of foods may be associated with the disease.[31-36] However, a recent study from Northern England did not support the hypothesis of an increased risk of stomach or esophageal cancer associated with high levels of nitrate in drinking water.[37]

Findings from epidemiological studies of precursor lesions of esophageal cancer among young persons in a high-risk population of China suggested that histologically confirmed esophagitis was found in 43.5% of male and 35.6% of female subjects.[38] Mild and moderate esophagitis was positively associated with consumption of extremely hot beverages, family history of esophageal cancer, frequent consumption of cottonseed oil, cigarette smoking, a clinical diagnosis of oral leukoplakia, and seborrheic dermatitis. Negative associations noted included frequent consumption of fresh fruit, meat and eggs.

Exposures to environmental risk factors and nutritional deficiencies in childhood and early life might be responsible for inflammation and weakened esophageal epithelium, resulting in a condition possibly more favorable for the development of esophageal cancer.[27,38] Etiological and environmental factors associated with esophageal malignancies have been well discussed in the literature,[3-7] with environmental factors appearing to be predominant in the causation of esophageal malignancy, with genetics playing a minor role. Whether this postulation of environmental factors with long latent periods holds good for these isolated teenage reports of childhood esophageal malignancies needs further investigation. The only possible etiological factor linked to esophageal carcinoma has been the documentation of the carcinoma developing from lye ingestion.[6] There is, however, a long latency period (12 years or more) between the ingestion of lye and the development of the malignancy.

Our patient is enjoying excellent health and there is no evidence of recurrence. We have not been able to associate her disease with any etiological or environmental factor known to predispose the malignancy. She also did not have any of the known precancerous lesions that could have contributed to her disease.

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