



# Pediatric Anxiety Disorder after Operation for Carcinoid: A Case Report

Sevgi Buyukbese Sarsu, Burcu Belen, Ramazan Ucak

Gaziantep Children's Hospital, Gaziantep, Turkey

Email: [sarsusevgi@yahoo.com.tr](mailto:sarsusevgi@yahoo.com.tr)

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## Abstract

One of the most common abdominal emergency situations which requires operation is acute appendicitis. The obstruction of the lumen is the primary cause of acute appendicitis and some unusual factors such as a carcinoid tumor may be involved in the pathogenesis. This rare tumor describes a 16-year-old girl presented with an abdominal pain which had a clinical presentation that was not different compared with the usual form of appendicitis and was diagnosed via the investigation of the appendectomy specimen histopathologically. During the follow-up, no oncologic adjuvant therapy was needed. However, at routine pediatric surgery examinations, child cardiology and psychiatry consultations were requested since the patient reported tachycardia, sweating, and difficulty of breathing, which were not present before. The postoperative period was surgically free of complications in the child surgery clinic controls and there was no metastasis. However, the pediatric anxiety disorder treatment of the patient is ongoing. This type of clinical postoperative manifestation is not found in the literature and a multi-disciplinary approach may be needed in appendix carcinoid tumor cases even after an unproblematic surgical intervention.

## Keywords

Appendix Carcinoid Tumor, Anxiety Disorders, Appendicitis, A Child

**Subject Areas:** Oncology, Pediatrics, Psychiatry & Psychology, Surgery & Surgical Specialties

## 1. Introduction

Appendicitis is the most commonly observed condition of the abdomen. Appendix carcinoid tumor (ACT) is one of the unusual causes [1] [2]. Anxiety disorders are more common than hyperactivity disorder in the pediatric population.

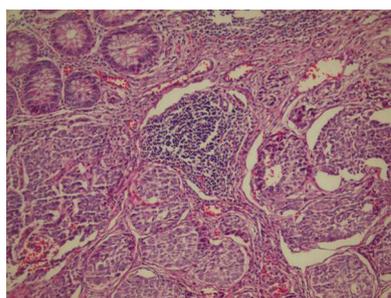
## 2. Case Report

A sixteen-year-old girl admitted to our emergency department with abdominal pain and nausea localized at the right lower quadrant. White blood cell count was  $12,000/\text{mm}^3$  ( $N \leq 10,000/\text{mm}^3$ ). Sixteen hours after hospitalization, the patient was carried to the operation room. Open appendectomy was performed. At inspection, the appendix was mildly hiperemic in appearance. There was no suspicion for an appendicular tumor. However, histopathologic examination revealed a tumoral growth of monomorphic cells demonstrating insular structures and mitotic figures which fill the lumen in the distal of the appendix, infiltrating the muscular tissue and approaching to the serosa (**Figure 1**). Since the histologic evaluation revealed a carcinoid tumor. No chemotherapy was recommended as tumor cells were not detected in the incision site (**Figure 2**).

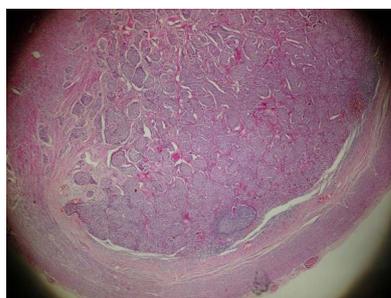
Four days after operation the patient started to report symptoms of tachycardia, chest pain, sweating, and difficulty of breathing. There was no cardiologic pathology. Two months later, the patient was admitted to dermatology with eruptions at the dorsal-thoracic area. These dermatological findings resolved spontaneously in a couple of weeks. The patient admitted to the surgery clinic with tremors, dizziness, nausea, and vomiting 3 weeks later. Child psychiatry consultation was requested. The patient was started selective serotonin reuptake inhibitors because of anxiety disorder. She is followed up by the surgery clinic and monitored by the child psychiatry clinic even after 24 months postoperatively.

## 3. Discussion

Appendectomy is one of the most frequently performed operations worldwide. Obstruction may be due to a carcinoid tumor in rare occasions which is the most common one among the malign tumors of the appendix [3] and 60% of the tumors which originate from the appendix [4]. Being rare and usually detected incidentally in appendectomy, it is observed in 0.3% - 0.9% of appendectomy specimens [5]. Histopathologically, ACT is mostly enterochromaffin cell type and derives from a subepithelial cell group [6]. ACT forms 32% - 57% of the tumors originating from the appendix. It lacks specific clinical features and its clinical presentation may not differ from that of acute appendicitis. It is usually diagnosed incidentally during surgery for acute appendicitis [7]. There are publications reporting that it is observed in 0.47% of all appendectomies. Therefore, it is important to define a correct management of such a rare tumor. Most patients are treated with appendectomy. In the literature, in a se-



**Figure 1.** A tumoral growth of monomorphic cells (H&E  $\times 40$ ).



**Figure 2.** Tumor cells were not detected in the incision site (H&E  $\times 40$ ).

ries of 7 ACT out of 1485 appendectomy cases, long-term prognosis is reported to be good. However, pediatric anxiety disorders following ACT have not been reported previously. Anxiety disorders are among the earliest presenting psychiatric conditions with a median age of onset of 11 years. General population prevalence rates among children are reported to be before 18 in 5.7% - 12.8% of the patients. As such, anxiety disorders are encountered more commonly than attention deficit hyperactivity disorder. Left untreated, anxiety disorders tend to have a chronic and unremitting course [8] [9]. Anxiety is sometimes associated with Panic disorder characterized by unexpected panic attacks (not triggered by an identifiable stimulus) and typically begins in post-pubertal children and adolescents. Panic attacks feature a sudden onset of various somatic sensations including tachycardia, sweating, tremors, difficulty breathing. Panic symptoms often result in frequent trips to their pediatrician's office, emergency department, and even specialty settings such as cardiology or neurology for evaluation. Research suggests that both cognitive behavioral therapy [10] and selective serotonin reuptake inhibitors are effective in childhood anxiety disorders.

#### 4. Conclusion

Our aim here is to report a rare case of appendicitis due to a carcinoid tumor accompanied by anxiety disorder. We recommend psychological evaluation of every patient after the announcement of tumoral feature of appendix. Although our case experienced neither the surgical nor the late complications of the carcinoid tumor, intensive stress brought up psychological mood changes leading to the development of anxiety. In conclusion, a multidisciplinary approach including child surgery and oncology accompanied by child psychiatry is essential for these patients.

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