

Sessile Serrated Adenoma of Appendix

Appendiks Sesil Serrated Adenomu

Tayfun Kaya¹ , Semra Demirli Atıcı¹ 

¹ Department of General Surgery, University of Health Sciences Tepecik Training and Research Hospital, İzmir/Turkey

ÖZET

AMAÇ: Apendiksin sesil serrated adenomu (SSA) nadiren akut apandisit nedeni olarak görülür. Preoperatif görüntüleme ve testlerle tespit edilemeyen apendiksin bu premalign lezyonları histopatolojik inceleme ile kesin olarak teşhis edilebilir. Bu çalışma, apendiksin SSA tanı ve tedavisini değerlendirmeyi amaçlamaktadır.

GEREÇ VE YÖNTEM: Aralık 2014-2018 arasında akut apandisit tanısı ile opere edilen çalışmalar retrospektif olarak değerlendirildi. 7 hastanın postoperatif histopatolojik incelemesi apendiks SSA ile uyumlu raporlandı. Her hastanın başvuru semptomları, laboratuvar testleri, görüntüleme yöntemleri, cerrahi operasyon süresi, hastanede kalış süresi, postoperatif gelişen mortalite ve morbidite, postoperatif kolonoskopi raporları kaydedildi.

BULGULAR: Hastaların ortalama yaşı 48 (29-72) olup, 3'ü erkek ve 4'ü kadındı. Tüm hastalar akut apandisit tanısı ile genel anestezi altında açık yöntemle opere edildi. Postoperatif mortalite ve morbidite hiçbir hastada gözlenmedi. Apendektomi spesimen incelemesi SSA ile uyumlu olan preparatlar invazyon ve karsinom açısından dikkatlice değerlendirildi. Operasyondan iki ay sonra tüm hastalara kolonoskopi yapıldı. 4 hastanın kolonoskopisinde patolojik bir bulgu saptanmazken, 3 hastanın kolonoskopisinde inen ve sigmoid kolonda düşük dereceli displazi içeren tübüler adenom saptandı.

SONUÇ: Apendiksin sesil serrated adenomu tanı, tedavi ve postoperatif takip açısından dikkatli bir değerlendirmeyi gerektirir. Kolonun geri kalan kısmında yüksek dereceli SSA veya karsinom riski olasılığı nedeniyle postoperatif kolonoskopi yapılması önerilir.

Anahtar Kelimeler: sesil serrated adenoma, apendiks, kolon kanseri

ABSTRACT

OBJECTIVE: Sessile serrated adenoma of the appendix is rarely seen as a cause of acute appendicitis. These premalignant lesions of the appendix, which cannot be detected by preoperative imaging and tests, can be definitively diagnosed by histopathological examination. This study aims to evaluate the diagnosis and management of sessile serrated adenoma.

MATERIALS AND METHODS: The patients who underwent surgery due to the diagnosis of acute appendicitis between December 2014 and December 2018 were evaluated retrospectively. Seven patients' postoperative histopathological reports were compatible with sessile serrated adenoma of the appendix. Each patient's presenting symptoms, laboratory tests, imaging methods, type of surgical procedure, length of hospital stay, postoperative mortality and morbidities, postoperative colonoscopy reports were recorded.

RESULTS: The patient's median age was 48 (29-72) years. Three of the patients were male, and four were female. All the patients were diagnosed with acute appendicitis and operated with an open technique under general anesthesia. Postoperative mortality and morbidity weren't seen in patients. All appendectomy specimens which were compatible with sessile serrated adenoma were evaluated carefully for invasion and carcinoma. Two months after the surgery, colonoscopy was performed on all patients. Although four patient's colonoscopies were unremarkable, three of the patient's colonoscopies were reported as tubular adenoma with low-grade dysplasia in descending and sigmoid colon.

CONCLUSION: The diagnosis, treatment, and postoperative follow-up require more careful evaluation for sessile serrated adenoma of the appendix. Postoperative colonoscopy is recommended due to the possibility of a high risk of sessile serrated adenoma or carcinoma in the rest of the colon.

Keywords: sessile serrated adenoma, appendix, colon cancer

INTRODUCTION

Sessile serrated adenoma (SSA) of the appendix is rarely seen as a cause of acute appendicitis. These premalignant lesions of the appendix, which cannot be detected by

preoperative imaging and tests, can be diagnosed by examination with postoperative specimen pathologies. Although the incidence of appendix SSA is unknown, the

Yazışma Adresi/Address for Correspondence: Semra Demirli Atıcı, MD, S.B.Ü. Tepecik Eğitim ve Araştırma Hastanesi Güney Mahallesi, 1140/1. Sk. No:1, 35180 Yenisehir, Konak, İzmir/Türkiye

E-Posta/E-Mail: smrdemirli@hotmail.com || Tel: +90 536 362 4585

Received/Geliş Tarihi: 10.10.2020 || **Accepted/Kabul Tarihi:** 19.04.2021

Bu Eser Creative Commons Atıf-Gayriticari 4.0 Uluslararası Lisansı İle Lisanslanmıştır. This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0).



diagnosis, treatment, and postoperative follow-up due to carcinoma risk require more careful evaluation (1,2).

This study aims to review the patients whose postoperative appendectomy specimen pathology reports were compatible with SSA.

MATERIAL & METHODS

Seven patients who underwent emergency surgery due to the diagnosis of acute appendicitis were retrospectively analyzed between December 2014 and December 2018. A definitive diagnosis was identified with postoperative histopathological examination. Each patient's presenting symptoms, laboratory tests, imaging methods, type of surgical procedure, length of hospital stay, and postoperative mortality and morbidities, postoperative colonoscopy reports were recorded. This study is designed as a retrospective observational study.

RESULTS

The patient's median age was 48 (29-72) years. All patients were admitted to emergency service with complaints of abdominal pain, vomiting, and nausea persisting for one day. All patients were diagnosed with acute appendicitis with abdominal ultrasonography or computerized tomography (CT) (Figure 1-3).

Figure 1. Abdominal CT showed an increase in appendix diameter and periappendiceal heterogeneity



Figure 2. Abdominal CT showed an increase in appendix diameter and periappendiceal heterogeneity

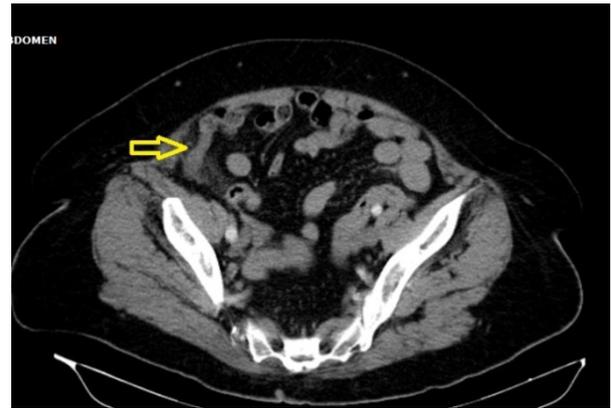


Figure 3. Abdominal CT showed an increase in appendix diameter and appendicolitis



The patients had no history of surgery and no family history of malignancy. Laboratory tests were unremarkable except for the range of the white blood cell which was increased (10.9-23.5 x10³/uL). Four female and three male patients were operated with an open technique under general anesthesia. All patients were operated with an incision of McBurney, except the eldest female patient who operated with a paramedian incision. The average operation time was 45 minutes and the mean length of hospitalization was two days which ranged from 1 to 4 days. Postoperative mortality and morbidity weren't reported.

Appendectomy specimen pathology results were compatible with SSA without invasion so that the patients don't need another surgical resection. All the diagnosis was confirmed by a postoperative histopathological study. All cases were detected as incidental lesions on routine microscopy. After two months of surgery for the possibility of colorectal carcinoma, colonoscopy was performed. Although four patient's colonoscopies were unremarkable, three of the patient's colonoscopies were reported polyps in the descending and sigmoid colon. Polypectomy

materials were reported as tubular adenoma with low-grade dysplasia. This study describes seven cases of SSA of

the appendix which was presented with clinics of acute appendicitis (Table 1).

Table 1. Demographic features of the patients

Patient	Age	Gender	Preoperative Ultrasound Imaging	Preoperative CT Imaging	WBC (x10 ³ /uL)	Postoperative Colonoscopy
Patient 1	29	M	Normal	Acute Appendicitis	13.9	Normal
Patient 2	57	F	Normal	Acute Appendicitis, Appendicolit	10.6	Low-Grade Tubular Adenoma in Descending Colon
Patient 3	72	F	Normal	Acute Appendicitis	20.0	Normal
Patient 4	67	F	Normal	Acute Appendicitis	8.3	Normal
Patient 5	49	M	Acute Appendicitis	CT: N/A	9.6	Low-Grade Tubular Adenoma in Sigmoid Colon
Patient 6	35	F	Normal	Acute Appendicitis	7.9	Normal
Patient 7	29	M	Acute Appendicitis	CT: N/A	8.9	Low-Grade Tubular Adenoma in Sigmoid Colon

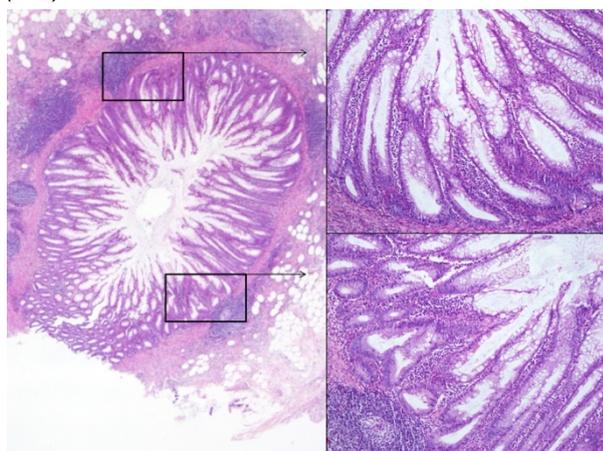
M: male, F: female, WBC: white blood cell, CT: Computed tomography, N/A: Not available, uL: microliter

DISCUSSION

SSA which was mostly located on the right colon is rarely seen in the location of the appendix (1, 2). Appendix SSA was generally found by the postoperative specimens, autopsies and could be diagnosed incidentally during colonoscopy (1, 3).

The diagnosis of SSA is based on basic histological features such as serration, dilatation, horizontal orientation, goblet cell differentiation, an asymmetric proliferative region with an L-shaped or inverted T-form at the base of the crypts (4,5) (Figure 4). In SSA, sawtooth-like structural changes in the dysplastic epithelium covering the basal aspect of the crypts were seen as in our cases (Figure 5).

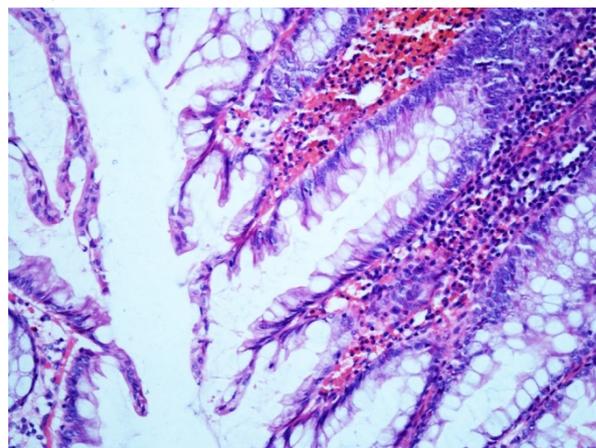
Figure 4. L-shaped or inverted T-form at the base of the crypts, hematoxylin, and eosin staining, magnification: 40x and 100x (inlet)



The incidence of SSA in the appendix is mostly unknown. Although Karabulut et al reported that the mean age was 52.5 for the SSA, in our study the mean age was 48 years (4). However, two male patients were 29 years old, Renshaw

et al reported that the incidence of SSA in patients 30 years or older were relatively high as our other five patients (6).

Figure 5. Sawtooth-like structural changes in the dysplastic epithelium, hematoxylin, and eosin staining, magnification: 200x)



There were no typical signs or symptoms that might be considered as representative of SSA, in the literature the most common clinical presentation is reported as acute appendicitis (3, 6, 7). The lumen of the appendix may become obstructed by SSA and cause inflammation (3, 6). The diagnosis of the SSA was made by the incidental findings during intraabdominal surgery, during abdominal CT scans for other medical conditions, or during a colonoscopy. The most common findings in abdominal CT are an increase in appendix diameter, appendicolitis, inflammation and heterogeneity around the appendix, which is consistent with the appearance of acute appendicitis similar to our presented cases. As in perforated appendicitis, heterogeneity can also be seen in the pericecal fluid and mesentery and target sign appearance can be observed in CT as in intussusception.

Also, cecal mass, peritonitis, carcinomatosis and ascites can be seen in CT performed due to nonspecific symptoms (3, 8-10).

The importance of SSA has increased in the last decade because morphological and molecular studies have determined that this type of lesion develops through the serrated pathway of colorectal carcinogenesis. Karabulut et al (4) have reported that basal dilatation, basal serration, T-/L-shaped crypts, and ectopic crypts are significantly more common in SSA which were susceptible to dysplasia and malignant transformation. Although SSA is rarely described in the appendix, they should be recognized and treated appropriately because they represent a higher risk of cancer.

SSA develops from the serrated pathway of colorectal carcinogenesis with KRAS mutation, methylation of the CpG island promoter regions of the tumor suppressor gene BRAF and inactivation of hMLH1 repair gene increases cytological dysplasia and potentially malign transformation (3, 6, 11, 12). Within the serrated pathway, there is also a possibility that there may be methylation of hMLH1, which is associated with SSA with severe dysplasia. These lesions with mismatch repair gene mutations and severe dysplasia are considered to progress more rapidly to colorectal cancers. Studies showed that mutations in the SSA of the appendix often harbor KRAS mutations, rather than BRAF mutations and there was a differentiation between the serrated pathway in the appendix and the colorectal region (4, 6).

The surgical treatment of SSA of the appendix had a wide perspective from endoscopic piecemeal resection during colonoscopy to the right hemicolectomy with regional lymphadenectomy. Although the resection should be managed by right hemicolectomy or appendectomy is controversial, for the treatment of SSA located in the appendix is the complete resection of the polyps with free margins.

During colonoscopy mostly polyps and neoplastic lesions of the appendix due to the characteristics and location of the lesion by piecemeal resection can be completely resected with sufficient (3, 6). The important point of resection was an invasion of the layers of submucosa and muscularis propria, protrusion of cecal wall, and removing the lesion with free margins (3). Although, carcinoma confined to the mucosa or well-differentiated adenocarcinoma with

submucosal invasion simple appendectomy is recommended. In some cases, especially patients who had a worse clinical performance partial cecal wall and appendix resection were suggested especially SSA which were elongated to the cecal wall. Suspicious malignant degeneration of large adenomas or tumor invasion of the cecum or adjacent organ the stated surgical treatment was right colectomy with regional lymphadenectomy with open or laparoscopic surgical techniques (3).

CONCLUSION

Appendix serrated adenomas which were mostly reported by the postoperative careful examination pathological specimens. The diagnosis, treatment, and postoperative follow-up require more careful evaluation for SSA. Postoperative colonoscopy is recommended due to the possibility of a high risk of SSA or carcinoma in the rest of the colon.

Acknowledgments

I would like to express my gratitude to Professor Cengiz Aydın and Associate Professor Mustafa Emiroğlu for advice drafting the study and Gülen Gül, MD from University of Health Sciences Tepecik Training and Research Hospital, Department of Pathology who helped for preparation the histopathological images. We thank our colleagues from the University of Health Sciences Tepecik Training and Research Hospital, Department of General Surgery who provided insight and expertise that greatly assisted the research. Thanks to all the peer reviewers and editors for their opinions and suggestions.

Etik: Bu olgu serisinde hastalardan onamları alınmıştır.

In this case series, informed consent was obtained from the patients.

Yazar katkı durumu; Çalışmanın konsepti; TK, SDA, dizaynı; TK, SDA, Literatür taraması; TK, SDA, verilerin toplanması ve işlenmesi; TK, SDA, istatistik; TK, SDA, yazım aşaması; TK, SDA,

Author contribution status; The concept of the study; TK, SDA, design; TK, SDA, literature review; TK, SDA, collecting and processing data; TK, SDA, statistics; TK, SDA, writing phase; TK, SDA,

Yazarlar arasında çıkar çatışması yoktur.

The author declares no conflict of interest.

Finansal Destek: yoktur / Funding: none

doi: <https://doi.org/10.33713/egetbd.808744>

10.5146/tjpath.2012.01140. PMID: 23011836.

11. Bettington M, Brown IS, Rosty C., Serrated lesions of the appendix in serrated polyposis patients. *Pathology*. 2016 Jan;48(1):30-4.

12. Liu C, Walker NI, Leggett BA, et al., Sessile serrated adenomas with dysplasia: morphological patterns and correlations with MLH1 immunohistochemistry, *Mod Pathol*. 2017 Dec;30(12):1728-1738.

REFERENCES

1. C A Rubio, Serrated adenomas of the appendix, *J Clin Pathol* 2004;57:946-949. doi: 10.1136/jcp.2004.018317
2. Snover DC, Jass JR, Fenoglio-Preiser C, et al. Serrated polyps of the large intestine: a morphologic and molecular review of an evolving concept. *American Journal of Clinical Pathology*. 2005;124(3):380-391
3. Martinez CA, Cutovoi J, Rossi DH, et al., Intramucosal Carcinoma of the Appendix Arising from Traditional Serrated Adenoma, *Case Reports in Surgery* Volume 2015, Article ID 297450
4. Karabulut YY, Savaş B, Kurşun N, et al. Serrated lesions of the appendix: Do they differ from their colorectal counterparts?, *Turk J Gastroenterol* 2014; 25: 29-34
5. Ma XM, Bourke MJ, Sessile Serrated Adenomas: How to Detect, Characterize and Resect, *Gut Liver*. 2017 Nov; 11(6): 747-760.
6. Renshaw AA, Kish R, Gould EW, Sessile Serrated Adenoma Is Associated With Acute Appendicitis in Patients 30 Years or Older, *Am J Clin Pathol* 2006;126:875-877
7. Hu CC, Chang JJ, Chen TC, et al, Colonoscopic feature of primary adenocarcinoma of the appendix. *Internal Medicine*. 2008;47(4):255-257
8. Sato K, Banshodani M, Nishihara M, et al. Sessile serrated adenoma/polyp leading to acute appendicitis with multiple pyogenic liver abscesses: A case report. *Int J Surg Case Rep*. 2018;42:38-43. doi:10.1016/j.ijscr.2017.11.057
9. Kamboj AK, Chen W, Krishna SG, et al. A Serrated Adenoma of the Appendix Presenting as a Submucosal Mass. *Am J Gastroenterol*. 2016 Dec;111(12):1677. doi: 10.1038/ajg.2016.320. PMID: 27924096.
10. Yildirim U, Ozaydin I, Erdem H, et al. Intussusception of the appendix induced by sessile serrated adenoma: a case report. *Turk Patoloji Derg*. 2012;28(3):290-2. doi: