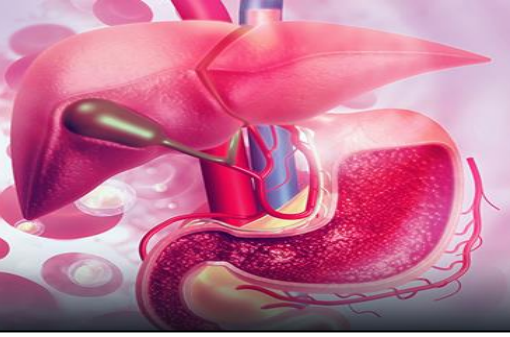
Enteron



Vol.3 |Issue 35 |2022

Dear Doctor,

Greetings from Micro Labs limited. We are happy to bring you "ENTERON" which contains latest and interesting news in the field of Gastroenterology.

Inside This Issue:

Should you require any specific article or medical information, please feel free to contact us at medicalservices@microlabs.in

Looking forward to your valuable feedback

Best Regards,

Medical Team, Micro Labs Ltd

Enteron

Vol.3 |Issue 35 |2022

1. Study on magnetically controlled capsule endoscopy in one-time gastro-small intestinal joint examination

Capsule endoscopy (CE) is a non-invasive approach for evaluating individuals with gastrointestinal bleeding that is difficult to diagnose. Clinicians frequently struggle to choose the next suitable diagnostic modality after initial endoscopy and colonoscopy, such as repeat endoscopy, radiographic modalities, or small intestinal examination with push enteroscopy.[1] With the advancement of capsule endoscopy technology in recent years, esophageal capsule endoscopy, colon capsule endoscopy, and magnetically controlled capsule endoscopy (MCE) have all been created for the evaluation of stomach illnesses.[2]Unlike traditional small bowel CE, which is normally done after a negative result from a gastroscopy or colonoscopy, the MCE can evaluate both the stomach and the small bowel at the same time, making the clinical examination procedure easier. The aim of this study was to check if magnetically controlled capsule endoscopy (MCE) might be used for a one-time GSI joint evaluation.[3]

Magnetically controlled capsule endoscopy

A total of 768 patients were included in the study, which was conducted retrospectively. A swallowable CE (11.8×27 mm), a guided magnetic robot, a data recorder, and a computer workstation with ESNavi software comprised the MCE system. The capsule can act for more than 10 hours, covering both the stomach and the entire small intestine in a single examination. Patients on a standardised gastrointestinal preparation regimen for MCE were directed to consume the capsule with a small amount of water while lying in the left lateral decubitus posture. The capsule was twisted and progressed to the fundus and cardiac areas after entering the stomach, then to the gastric body, angulus, antrum, and pylorus under magnetic control. To better visualise the stomach mucosa, this treatment was repeated twice in each patient. The baseline data for all patients was gathered retrospectively from the MCE databases. To confirm capsule excretion, patients were observed for two weeks. The study's major outcome was the success rate of a single gastro-small intestine (GSI) joint

examination, with secondary outcomes including gastrointestinal tract visibility and cleanliness, gastrointestinal transit durations, diagnostic yield, and MCE examination safety.

MCEs successfully observed>90% gastric mucosa in all 6 anatomic landmarks in 729 (94.92%) patients, whereas 39 patients failed to finish stomach examination (Table 1). Figure. 1 illustrate the pathological lesions discovered by MCE during the GSI joint assessment. In the oesophagus, forty lesions (5.21%) were found, with oesophagitis predominating (21/768, 2.73%). A total of 734 individuals had stomach lesions, with gastritis (587/768, 76.43%) and gastric polyps (98/768, 12.76%) predominating. MCE detected 62 patients (8.07%) with duodenal disorders. The magnetic guiding group had a higher rate of duodenal disease lesion detection than the control group (P=0.001). Positive lesions were found in both the stomach and the small intestine in 89 instances (11.58%).

Table 1: Success rate of GSI joint examination

Examination	Success rate, n(%)
Gastric examination	729 (94.92)
Small intestinal examination	748 (97.40)
GSI joint examination	711 (95.58)

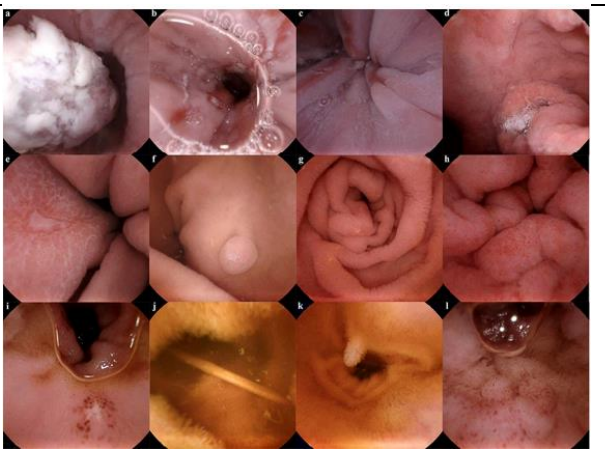


Figure 1: Positive lesions detected by MCE. a. Oesophagus cancer. b Oesophagus ulcer. c Oesophagitis. d Gastric cancer. e Gastric ulcer. f Gastric polyp. g Duodenum ulcer. h Duodenitis. i Small intestine ulcer. j Parasite. k Small intestine polyp. l Small enteritis

While the use of gastroscopy combined small bowel CE or enteroscopy is painful for patients and burdensome for medical resources, this study focused on a one-time comfortable gastrointestinal tract examination approach. MCE was developed to cover these gaps, and it is now frequently utilised in the evaluation of gastrointestinal illnesses, particularly stomach examination.[3] MCE is a practical and noninvasive method for direct and real-time observation of drug behaviour in the stomach. It is a safe and non-invasive endoscopic examination with a high accuracy rate for detecting small intestine disorders.[3,4]

The feasibility and safety of MCE in a one-time GSI joint examination were proven in this investigation. Magnetic steering, which improved the small intestine complete examination rate and increased the MCE diagnostic field, can also help with early pyloric transit of MCE.

References:

1. Levine I, Hong S, Bhakta D, McNeill MB, Gross SA, Latorre M. Diagnostic yield of inpatient capsule endoscopy. BMC Gastroenterol. 2022 May 12;22(1):236.
2. Zhang Y, Zhang Y, Huang X. Development and Application of Magnetically Controlled Capsule Endoscopy in Detecting Gastric Lesions. Gastroenterol Res Pract. 2021 Dec 30;2021:2716559.
3. Liu YW, Wang YC, Zhu JH, Jiang X, Zhou W, Zhang J, Liao Z, Linghu EQ. Magnetically controlled capsule endoscopy in one-time gastro-small intestinal joint examination: a two-centre experience. BMC Gastroenterol. 2022 May 4;22(1):222.
4. Chen XY, Da W, Liang R, Fan HN, Yi YC, Chen M, Qin HW, Zhang J, Zhu JS. The Detective Value of Magnetically Controlled Robotic Capsule Endoscopy in Patients With Suspected Small Intestinal Disease. Front Med (Lausanne). 2021 May 25;8:610563.

Enteron

Vol.3 |Issue 35 |2022

2. Helicobacter pylori, Lactose Intolerance, and 3 Hypotheses for Functional and Inflammatory Gastrointestinal and Hepatobiliary Disorders an Evolutionary Medicine Perspectives

INTRODUCTION

Evolutionary theory explains many medical conditions and it consists of all points at which evolutionary approaches shed useful light on medical topics which therefore contributes to new innovative treatments.[1] Causation of health and disease at two levels simultaneously is one of the most valuable contributions of evolutionary medicine which is explained in the Table 1.

Table 1: Summarising the core principles of evolutionary medicine

Topic	Core principle	Levels of selection	Vulnerabilities to disease can result when selection has opposing effects at different levels (e.g., genetic elements, cells, organisms, kin, and other levels)
Types of explanation	Both proximate (mechanistic) and ultimate (evolutionary) explanations are needed to provide a full biological understanding of traits, including those that increase vulnerability to disease	Phylogeny	Tracing phylogenetic relationships for species, populations, traits, or pathogens can provide insights into health and disease
Evolutionary processes	All evolutionary processes, including natural selection, genetic drift, mutation, migration, and non-random mating, are important for understanding traits and disease	Coevolution	Coevolution among species can influence health and disease (e.g., evolutionary arms races and mutualistic relationships such as those seen in the microbiome)
Reproductive success	Natural selection maximizes reproductive success, sometimes at the expense of health and longevity	Plasticity	Environmental factors can shift developmental trajectories in ways that influence health, and the plasticity of these trajectories can be the product of evolved adaptive mechanisms
Sexual selection	Sexual selection shapes traits that result in different health risks between sexes	Defences	Many signs and symptoms of disease (e.g., fever) are useful defences, which can be pathological if dysregulated
Constraints	Several constraints inhibit the capacity of natural selection to shape traits that are hypothetically optimal for health	Mismatch	Disease risks can be altered for organisms living in environments that differ from those in which their ancestors evolved
Trade-offs	Evolutionary changes in 1 trait that improve fitness can be linked to changes in other traits that decrease fitness	Cultural practices	Cultural practices can influence the evolution of humans and other species (including pathogens), in ways that can affect health and disease (e.g., antibiotic use, birth practices, diet, etc.)

Examples of evolutionary thinking in gastroenterology and hepatology

Helicobacter pylori infection

Helicobacter pylori infected almost more than half of the human population. The bacterium and its host has enabled much time in evolutionary processes. Retrieval of the complete bacterial genome from the 5,300-year old Iceman discovered in the Italian alps detected *H. pylori*. Approximately 100,000 years ago, known *H. pylori* species reveal transfer from an unknown species to African humans, which carried the bacterium to other continents stated by Phylogenetic analyses. Forced relocation of West African slaves to North and South America and the Caribbean (Figure 1), the current distribution of *H. pylori* strains reflects prehistoric and

Enteron

Vol.3 |Issue 35 |2022

historic human migrations resulting in admixture of bacterial and human populations. There seem to underlie geographic variations in gastric cancer incidence from its distribution and virulence factors. However, from

different geographic regions there is great variation in progression to cancer among infected individuals that does not fully explain from the current knowledge of these features, but is largely explained by coevolution.

The geographic ancestry, migration, their coevolution, and the evolution of antibiotic resistance from *H. pylori* strongly affect bacterial toxicity, carcinogenesis, and response to eradication therapy, worldwide regional variation in rates of eradication by antibiotics and to screen asymptomatic subjects for H. pylori to prevent gastric cancer it complicates the decision. Reported cost-effectiveness in low to intermediate risk Western countries should be considered in light of uncertainties concerning screening benefits in patients with dyspepsia and hazards of antibiotic resistance induced by wide-spread eradication therapy.[2]

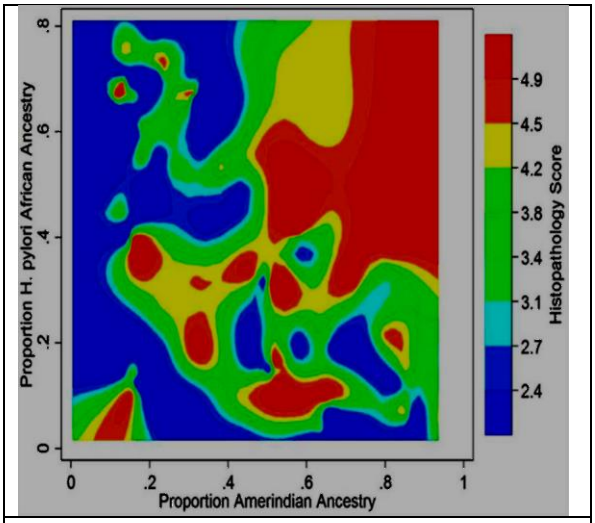


Figure 1: Proportion of H. pylori in African and American ancestary

Lactose intolerance

Humans and all other mammals would normally have stopped expressing lactase after weaning before the Neolithic period approximately 11,000 years ago. During most of the human history a lactose-free environment has been present for most adults. Lactase persistence throughout adulthood was resulted from mutations in individuals with the ability to digest lactose, which conferred a strong nutritional advantage through domesticated milk. In the Middle East and Africa after dairying began 5 such mutations appeared independently. In Central and Western Europe, one of these mutations reached very high frequencies after human migration and had lactase persistence in Africa, the Middle East, and the Indian subcontinent from other mutations. This evolutionary perspective had a practical implication on lactose intolerance or lactase deficiency which in fact was common, but had traditionally labelled as disease by patients and physicians. Lactase persistence found to be exhibited by approximately 35% of world's population. Lactase non-persistence could be framed neutrally by explaining this evolutionary fact by the physician that may relief individuals with symptomatic lactase non-persistence which would normalise lactose-free environment.[2]

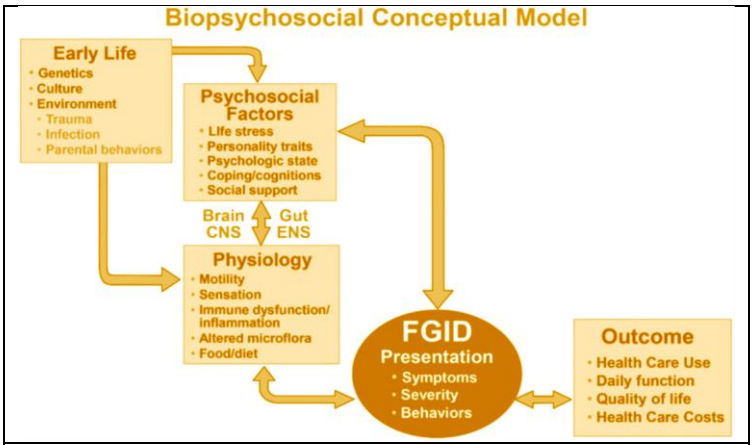


Figure 2. Biopsychosocial model

Polyvagal hypothesis

Despite extensive research, Functional gastrointestinal disorders (FGID) etiology and pathophysiology remain largely unknown, but this hypothesis was explained by Rome Foundation using biopsychosocial model (Figure 2) which described the factors contributing to the development and maintenance of FGID. The polyvagal theory, proposed by Porges in 1995 explained the evolution of the mammalian autonomic nervous system. This

proposed that in the short term acute neural defence responses that are caused by severe stress are adaptive and beneficial, but if it is chronically maintained becomes fibromyalgia. It also states that valid markers of autonomic nervous system function are respiratory sinus arrhythmia and related indices, such as vagal efficiency. The dampened respiratory sinus arrhythmia is a marker for a chronic maladaptive state of the neural, mainly vagal and control mechanisms in patients with irritable bowel syndrome and other FGID. Testable research questions which have the direct application to the treatment of FGID can be generated by this hypothesis. Vagal efficacy will be the first simple non-invasive biomarker that predicts response of FIGD to treatment if the results are replicated and confirmed.[2]

Thrifty gene hypothesis

Geneticist Neel proposed that a thrifty genotype conferred survival advantages to Paleo-Indians 60 years ago. The hypothesis proposed that individuals who were metabolically thrifty regarding fat storage, glucose tolerance, and insulin regulation were selected from cycles of feast or famine. Obesity, type2 diabetes, and metabolic syndrome were exhibited in high rates in Indigenous Americans, genetic differences of body mass variation found to be attributed for about 40%–75%. Associated genetic variants at many loci have found approximately 25% genetic component to gallstone disease, particularly the ABCG8D19H genotype in Amerindians and Indigenous Americans, with the greatest risk factor for gallbladder cancer. Some evolutionary role is likely, regardless of the mechanisms. An important point for practitioners is that certain disorders; including non-alcoholic fatty liver disease and gallstone disease and their complications may be predisposed in patients who have partial Indigenous ancestry. It can also distract attention from societal factors, such as poor access to healthy food from too much emphasis on this hypothesis.[2]

Hygiene hypothesis

In 1989 the hygiene hypothesis resulted from the speculation by Strachan. The hypothesis stated that improved hygiene prevented childhood infection that caused to increase prevalence rates of asthma. Rapid evolutionary adaptation was resulted in allergic diseases. Coevolution of humans' beneficial microbiota was disrupted from modern sanitised lifestyle which was helpful since millennium. Diseases are linked with increased alterations of the gut microbiome. In developed countries infectious diseases are decreasing and the concurrent autoimmune disorders are increasing, widespread helminth infection in tropical countries were seen with lack of autoimmune disease and with great importance in immune activity from gut microorganisms. During the first 5 years of life inflammatory bowel disease (IBD) incidence was reduced by rural residence and increased by antibiotic use in infancy, associated with migrating from developing countries to more economically developed countries. These observations emphasize the important role in preservation of early-life microbiota in very young patients from careful antibiotic use. Further research could predict successful therapy stemming from this hypothesis that may identify microbiome and other features in patients with IBD.[2]

To broaden understanding about the reasons for diseases in human population and their pathogenesis evolutionary medicine perspectives plays an important role. It also contributes in policies on screening, in providing an explanatory frame work for patients, influence treatment, and leads to productive research.

Enteron

Vol.3 |Issue 35 |2022

Evolutionary medicine perspective expands the knowledge and the ability to understand disease processes by improving care and further stimulating research.

References:

1. Stearns SC. Frontiers in Molecular Evolutionary Medicine. J Mol Evol. 2020 Jan;88(1):3-11.
2. Leontiadis GI, Longstreth GF. Evolutionary Medicine Perspectives: Helicobacter pylori, Lactose Intolerance, and 3 Hypotheses for Functional and Inflammatory Gastrointestinal and Hepatobiliary Disorders. Am J Gastroenterol. 2022 May 1;117(5):721-728.

Enteron

Vol.3 |Issue 35 |2022

3. A retrospective multi-centre study to assess the clinical outcome of ampullary adenoma with endoscopic papillectomy

Ampullary adenomas are also known as adenomas of the major duodenal papilla, it occurs sporadically or as familial adenomatous polyposis in the context of genetic syndromes (Figure 1). The potential ability of these lesions can modify malignant lesions to ampullary cancer, hence it is highly recommended for resection.[1] Safe and effective treatment for ampullary adenomas was established from endoscopic papillectomy and it has largely replaced surgical ampullectomy due to its complications from surgical management.[1,2] The objective of the study was to analyse the outcome of endoscopic papillectomy and to assess the factors that are affecting these outcomes.

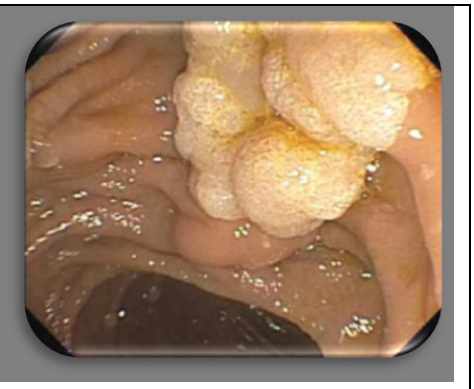


Figure1 :Image showing large ampullary adenoma

The retrospective data was analysed for ampullary adenomas in patients who had undergone endoscopic papillectomy. Their risk factors and clinical outcomes were evaluated and defined as (1) curative resection: complete endoscopic resection without recurrence; (2) endoscopic success: treatment of ampullary adenoma with endoscopy without surgical intervention; (3) early recurrence: reconfirmed adenoma at first endoscopic surveillance; and (4) late recurrence: reconfirmed adenoma after first endoscopic surveillance. Adverse effects seen in 30% were delayed bleeding, cholangitis.

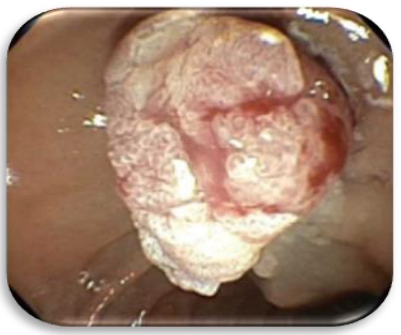


Figure 2: Ampullary adenoma after removal

The study included a total of 106 patients. Among which, 81 had undergone curative resection, 99 showed endoscopic success and most of the non-curative resection patients were managed with endoscopy. Piecemeal resection seen in 16, 22 patients showed positive/uncertain resection margin, early recurrence was seen in 11 patients, late recurrence in 13 patients, and 6 patients had re-recurrence. In early and late recurrence the significant risk factors were positive/uncertain margin and piecemeal resection [Odds ratio (OR) = 4.023, P = 0.048] and (OR = 6.610, P = 0.005). Even for non-curative resection significant risk factor was piecemeal resection (OR = 5.424, P = 0.007). Endoscopic papillectomy outcomes are summarised in table 1.

Enteron

Vol.3 |Issue 35 |2022

Table1. Summarising the endoscopic papillectomy outcomes

	n (%)/mean ± SD (*n* = 106)
Resection margin	
Negative	84 (79.2)
Positive/Uncertain	22 (20.8)
Positive	19 (17.9)
Uncertain	3 (2.8)
Curative resection	81 (76.4)
Early recurrence	11 (10.4)
Late recurrence	13 (12.3)
Re-recurrence	6 (5.7)
Endoscopic success	99 (93.4)

Safe and effective outcome in ampullary adenoma was achieved by endoscopic papillectomy, despite of adverse events seen in 26 patients. However, it is necessary to be careful during selection and follow-up of patients, specifically with positive/uncertain margin and piecemeal resection cases.[3] Figure 3 represents the longest adenoma free period before recurrence was 27 months and without recurrence was 94 months. Kenjiro Yamamoto et al. stated that the number of resections must be reduced in patients who undergo many piecemeal resections in a single procedure as much as possible and careful follow-up by endoscopic observation and with a tissue biopsy.[1] So H, Ko SW., stated that the patients with advanced pathologies had experienced a much higher recurrence rate than those with low-grade dysplasia, even after complete resection. However, the grade of dysplasia did not affect the recurrence after incomplete resection. Hence suitable strategies should be tailored for individuals based on their pathologic reports. This may reduce the burden on endoscopic resources, patient's risk for possible biopsy-induced pancreatitis, and medical costs.[2]

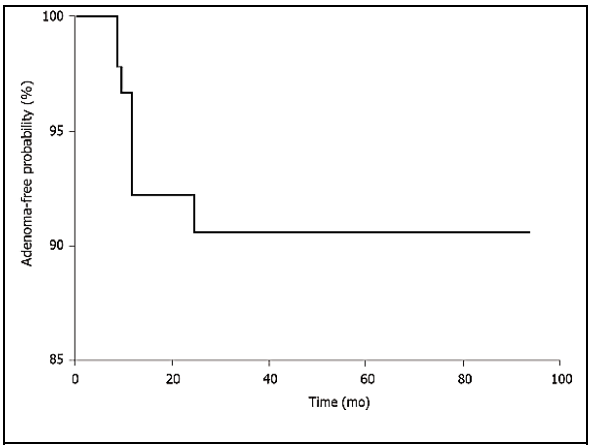


Figure 3: Adenoma-free survival rate after endoscopic papillectomy

Ampullary adenomas had a high technical success with endoscopic papillectomy which was found to be a feasible treatment option from the study. However, diagnostic discrepancy, remnant lesions, recurrence, and

adverse events should not be neglected, even in cases of complete resection. Likelihood of recurrence should be considered, and closer follow-up for recurrence is essential.

Significant risk factors for poor outcomes were mainly from piecemeal resection and positive/uncertain margin. Therefore, during endoscopic papillectomy to ensure adequate free margin and to perform *en-bloc* resection every effort must be taken necessarily.

Reference:

1. Yamamoto K, Sofuni A, Tsuchiya T, Ishii K, Tsuji S, Tanaka R, Tonozuka R, Honjo M, Mukai S, Fujita M, Asai Y, Matsunami Y, Nagakawa Y, Yamaguchi H, Itoi T. Clinical Impact of Piecemeal Resection Concerning the Lateral Spread of Ampullary Adenomas. Intern Med. 2019 Apr 1;58(7):901-906.
2. So H, Ko SW, Shin SH, Kim EH, Park DH. Impact of 5-Year Endoscopic Surveillance Intervals with Biopsy following Endoscopic Papillectomy for Ampullary Adenoma. J Pers Med. 2022 Jan 5;12(1):51.
3. Choi SJ, Lee HS, Kim J, Choe JW, Lee JM, Hyun JJ, Yoon JH, Kim HJ, Kim JS, Choi HS. Clinical outcomes of endoscopic papillectomy of ampullary adenoma: A multi-center study. World J Gastroenterol 2022; 28(17):1845-1859.

Enteron

Vol.3 |Issue 35 |2022

4. Angiolipoma of the colon with self-limiting Gastrointestinal Bleeding

Angiolipoma is a benign tumour made up of adipose tissue and proliferative vascular components that most commonly develops in the subcutaneous tissues of the extremities and trunk. The gastrointestinal (GI) tract angiolipoma is extremely rare.[1] Angiolipomas are extremely uncommon in the colon, accounting for less than 1% of all benign lesions in the colon. Computed tomography (CT) often depicts this lesion as a malignant looking tumour, however it may be valuable in aiding diagnosis by displaying areas of enhancement and adipose components. For diagnosis, resection and histological examination are frequently required. On colonoscopy, an asymptomatic patient presenting for assessment of self-limited episodes of rectal bleeding was discovered to have a malignant-appearing lump in the hepatic flexure, which was later identified as an angiolipoma.[2]

A 50-year-old man with a history of hypertension and hyperlipidemia presented for examination of self-limited rectal bleeding that had lasted three days. The abdomen was soft, nontender, and nondistended on physical examination, with normal bowel sounds and no palpable lumps. Colonoscopy revealed a big, ulcerated, nonbleeding tumour in the hepatic flexure that appeared to be malignant (Fig. 1).

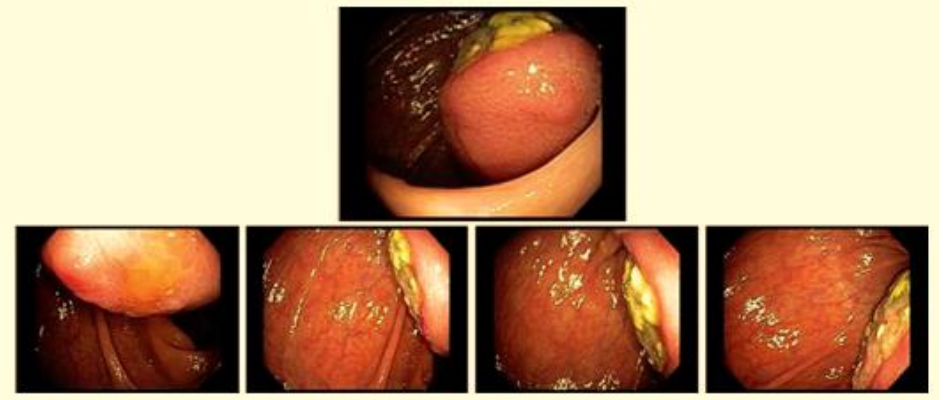


Figure 1: Endoscopic identification of malignant-appearing mass in hepatic flexure

PET-CT images revealed an abnormally enlarged colon at the hepatic flexure, as well as a 4.4 cm fatty structure in the proximal transverse colon with no fluorodeoxyglucose radiotracer uptake (Fig. 2). The cause of these observations was unknown.

Enteron

Vol.3 |Issue 35 |2022

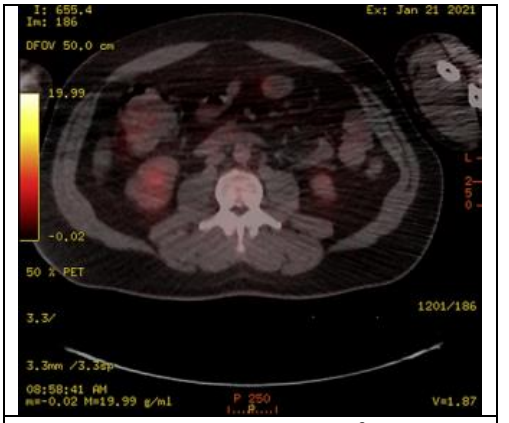


Figure 2: PET-CT image of mass in hepatic flexure without FDG uptake.

For a definitive diagnosis of the mass, the patient underwent a robotic-assisted laparoscopic right colectomy. The pelvis and peritoneum showed no signs of distant metastases. The pathology report revealed a 4.4 × 4.0 × 4.0 cm projecting mass with red and glanular mucosa, as well as submucosal fatty cut surfaces, consistent with angiolipoma (Fig. 3). To rule out the likelihood of angiomyolipoma, immunohistochemical staining was used. The patient tolerated the surgery well afterward, with no complications, and was released after one day of observation.

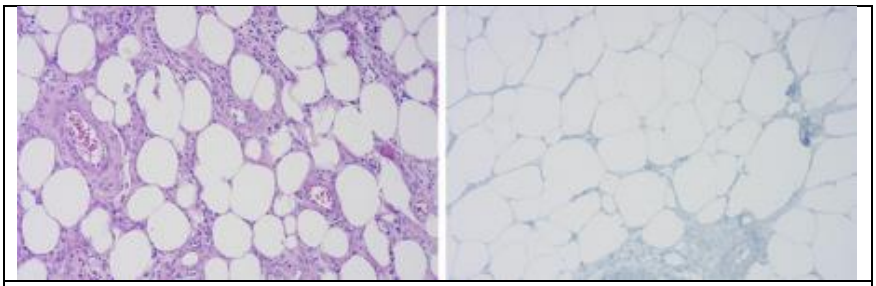


Figure 3: The adipocytes demonstrate no nuclear atypia, mitosis, or necrosis. Branching network of thin- and thick-walled vessels vary in sizes. There are no visible fibrin thrombi within blood vessels

Bowen was the first to report angiolipomas in 1912. Angiolipomas differ from lipomas in that they frequently occur beneath the skin of the upper extremity, as well as the thoracic and abdominal walls, according to Howard's description from 1960. It has a capsule and distinct borders from a pathological standpoint. They are benign tumours with mature adipose tissue and blood capillaries that only rarely become cancerous. Depending on the quantity of fat and vessels, they are classed as either lipoma or hemangioma.[3] Angiolipoma treatment varies according to the size and symptoms of the patient. Endoscopic excision may be recommended for tiny polyps that pose little risk of bleeding or perforation. In the instance of our patient, laparoscopic procedures

allowed for a full removal of the tumour with little invasiveness, lowering the risk of recurrence and postoperative surgical complications.[2]

In conclusion, angiolipomas are benign subcutaneous tumours made up of adipose tissue and vascular components that are rare. While these tumours are usually painless, they can cause self-limited rectal bleeding or a positive faecal occult blood test in a patient who is otherwise asymptomatic. Consequently, despite their rarity, it is critical to comprehend the clinical, radiologic, and endoscopic features associated with these tumours in order to improve diagnosis accuracy and assure appropriate treatment action.

Reference:

1. Sun J, Kang W, Zeng Z, Zhang Z, Wang X. Rare localization of angiolipoma in the gastrointestinal tract: a case series. J Int Med Res. 2020 Sep;48(9):300060520938589.
2. Patel M, Kim E, Zhou W, Ratuapli S: Angiolipoma of the Colon: A Rare Cause of Gastrointestinal Bleeding. Case Rep Gastroenterol 2022:290-294.
3. Kimura A, Morinaga N, Tajima K, Ogata K, Kato H, Sohda M, Shirabe K, Saeki H. Colon angiolipoma with intussusception resected by laparoscopy-assisted surgery: a case report. Journal of Surgical Case Reports. 2021 Aug;2021(8):rjab329.