

# UNROOFING TECHNIQUE AS AN OPTION FOR THE ENDOSCOPIC TREATMENT OF GIANT GASTROINTESTINAL LIPOMAS

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**Summary:** Gastrointestinal lipomas are usually asymptomatic, detected incidentally. However, they can cause severe symptoms such as obstruction, invagination, and bleeding. The transection of an infarcted or large lipoma by needle sphincterotome (needle knife) and/or snare polypectomy of the upper part of the tumour is an option for the endoscopy treatment of giant infarcted lipomas. Cutting a top of lipoma (unroofing technique) allowed flow out of adipose tissue from the lipoma.

**Keywords:** Endoscopy; Giant gastrointestinal lipoma; Needle sphincterotome; Unroofing technique

## Introduction

Gastrointestinal lipomas are rare, benign, usually single, slowly growing mesenchymal tumours, mostly found in the colon (65%) and small bowel (20%) (1–6). Lipomas tend to occur in older population sections and they are usually asymptomatic, detected incidentally (7, 8). However, they can rarely cause severe symptoms such as abdominal pain, intestinal obstruction, invagination, life-threatening bleeding, diarrhoea or even perforation (9–23). Franc-Law et al. (15) reviewed 275 previously reported cases of colonic lipoma, 28 patients (10%) had a dramatic presentation with pain and/or rectal bleeding, being the most significant prodromal symptom. In this subset the lipomas tended to be larger, frequently had associated marked necrosis or ulceration, and were less likely to be located in the ascending colon and caecum. Such lipomas usually reveal marked ischaemic changes (15).

## Diagnostics

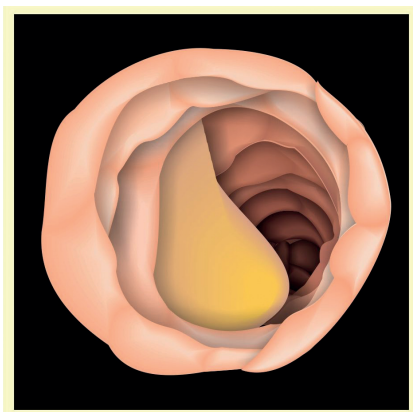
There are no difficulties to diagnose gastrointestinal lipomas properly in vast majority of cases. Endoscopic appearance of a lipoma is quite characteristic, with its bright yellow colour. The lesions are soft and compressible (a cushion sign), the overlying mucosa is normal (1). Recognition at endoscopic ultrasound, computed tomography or magnetic resonance imaging is unequivocal and definite, too.

Colour of infarcted lipomas is dark purple and brown-red-dish (with tiny islands of yellowish adipose tissue). Their surface is smooth, glossy and tight (24). Quite seldom, it might be difficult to distinguish other mesenchymal tumours (like liposarcoma), especially in symptomatic elderly people. Surgical resection with subsequent histology may be the solution in such a case (25).

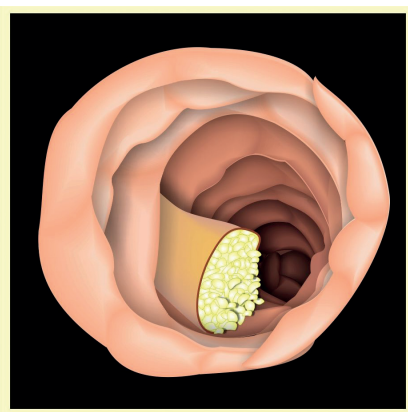
## Therapeutic options

Asymptomatic lipomas do not require any treatment. Symptomatic gastrointestinal lipomas could be removed endoscopically by means of snare polypectomy (5, 6, 17, 18, 23, 26–30) or by endoscopic submucosal dissection (31–33). Preventive submucosal injection (saline or epinephrine), clipping of a lipoma base and the use of detachable nylon or polyglactin loop could reduce the risk of complications such as bleeding or perforation (28, 34–39). Some authors recommend the use of a double-channel endoscope with placing a ligating loop device around the lipoma base with the assistance of a grasping forceps (40) or grasping-forceps-assisted endoscopic resection (41–44). Endoscopic polypectomy is considered to be possible in smaller size (less than 3 cm) and pedunculated lipomas (13, 45). Larger lipomas are suggested by some authors for surgery because of the risk of complications after endoscopic polypectomy of submucosal tumours (perforation, bleeding) (8, 13, 15, 45–48). Use of SB knife (a scissor type device for submucosal dissection) with double-balloon endoscopy has been reported as a safe option to avoid surgical resection of small intestinal lipoma (49). Large transmural lipoma should be always referred for surgery (22). Self-amputation of colonic lipoma is exceptional (50–52). Some authors recommend looping and ligating lipoma with the detachable snare without endoscopic resection (“Loop-and-let-go” or “Ligate-and-let-go” technique) (32, 33, 37, 40, 53, 54). This ligation produces an asymptomatic, slow mechanical transection of the lipoma (54). The endoscopic ligation should not be attempted in the treatment of broad based or sessile colonic lipomas (55). In these circumstances, endoscopic or surgical resection may be appropriate (54).

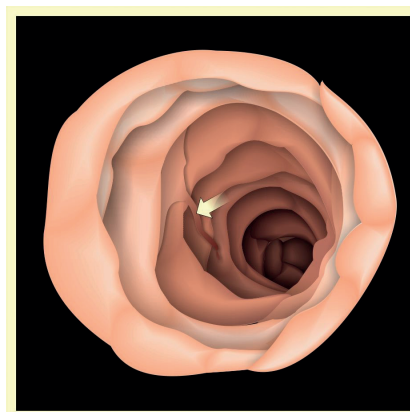
Large colonic lipomas occlude the intestinal lumen thus making it difficult to snare the lesion. In such a case, another



**Fig. 1:** Pedunculated lipoma of the large bowel. Bright yellow colour is characteristic.



**Fig. 2:** Upper third of the lipoma body was cut off using a needle sphincterotome (a needle knife).



**Fig. 3:** Cutting off the polyp body allowed flow out of adipose tissue from the lipoma subsequently within couple of days or a few weeks. The remnant of lipoma stalk is marked with an arrow

option for giant lipomas is endoscopic treatment by means of unroofing technique (24) to avoid surgery.

### Unroofing technique

Using the unroofing technique we cut off only the upper half or one third of the lipoma body using electrocautery snare. The remaining adipose tissue is subsequently extruded from the open surface. Therefore, this is a simple technique that allows both histological confirmation and complete treatment with minimal risk of perforation (see Figures No. 1–3). Using duodenoscope and grasp-and-snare technique in the management of a large, duodenal lipoma or combine this technique with a double-channel endoscope is also possible. Another possibility is consecutive dissecting the overlying mucosa on the lipoma body by means of a needle-knife in order to completely extrude the mass of the fat tissue (56–63).

We recommend this unroofing technique especially for giant and/or infarcted lipomas (54). We start with an initial cutting with an incision of the visible part of the polyp by means of a needle sphincterotome (needle knife). This transection made it possible to subsequently grasp the lipoma by a snare and to cut off upper third of the tumour (24). Cut covering of lipoma should be extracted for histology.

Mimura et al. (56) were probably the first who reported this method by for endoscopic resection of colonic lymphangioma. Hizawa et al. (57) as the first used unroofing technique for the endoscopic resection of a large lipoma. They cut the upper third of large duodenal lipoma. This revealed a hole in the overlying mucosa and adipose material rapidly exuded from the cut surface through this opening (57). This technique only cuts off the upper half of the submucosal tumour, thus reducing the risk of complications. Since this initial experience, successful endoscopic treatment using unroofing technique has been reported by several authors (29, 31, 34, 58–60).

Binmoeller et al. (61) and Lee et al. (62) recommended endoscopic partial resection with the unroofing technique also for diagnostics of subepithelial tumours originating from the muscularis propria, such as gastrointestinal stromal tumours, leiomyoma or neuroendocrine carcinoma. Unlike unroofing technique of lipomas, procedural blood oozing was relatively common (9/16 cases; 56%) but easily controlled by argon plasma coagulation (62). There are no reports on local recurrence of lipomas after their endoscopic treatment, no data on follow-up of these patients are given in available literature.

### Complications

Complications of the method are very rare. Adipose tissue contains not enough water to facilitate conduction of electric current, which is why endoscopists apply higher electrical output for snare during procedure, causing thermal injury on the colon wall adjacent to the mass and increasing the likelihood of perforation (58). The unroofing technique prevents this complication. In cases of polypectomy, polyps larger than 1 cm in the right colon or larger than 2 cm in the left colon and multiple polyps carried an increased risk of bleeding and/or perforation (63–65). Generally, lipoma with a broad base or a large diameter has the risk for complication after endoscopic resection (58).

### Conclusions

In conclusion, transection by means of electrocautery snare and/or needle sphincterotome is an optional and effective technique for endoscopic treatment of giant symptomatic gastrointestinal lipomas. The cut cover of the lipoma is possible to remove for histopathology. Although the transformation to liposarcoma is extremely rare (described only as sporadic case reports in the literature), biopsy from large

lipomas is recommended. Cutting the lipoma body (unroofing technique) allowed flow out of adipose tissue from the lipoma. This technique is quite safe as the risk of perforation and/or bleeding is unlikely.

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