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## Left colon interposition for esophageal reconstruction after perforation by metal blades ingestion: a case report

C. BIZZOCA, S. PISICCHIO, G. TORCHIA, L. VINCENTI

**SUMMARY:** Left colon interposition for esophageal reconstruction after perforation by metal blades ingestion: a case report.

C. BIZZOCA, S. PISICCHIO, G. TORCHIA, L. VINCENTI

*Esophageal reconstruction with colonic or jejunal segment is a second choice treatment when the stomach is injured or not adequate for use. These reconstructions, whether pedicled or as free jejunal graft, are technically demanding and they are associated with high rate of morbidity and mortality. Complications are mainly due to insufficient blood supply and therefore anastomotic leak or stricture and graft necrosis. We describe the case of a 51-year-old psychiatric man with diagnosis of esophageal perforation after ingestion of metallic razor blades for suicide intent. The patient was treated at an outside hospital with endoscopic removal of the blades and apposition of endoscopic clips, be-*

*cause of esophageal mucosal perforation. Nevertheless, he developed a septic status caused by mediastinitis. The patient underwent several interventions to solve the sepsis and after complete recovery he was referred to our Department for esophageal reconstruction. During surgery we found that the stomach was unavailable for reconstruction, therefore a left colonic interposition pedicled on the left colic vessels was performed through the retrosternal route. During the postoperative course the patient developed acute respiratory failure and suppuration of the cervical wound. The postoperative course was complicated because of the poor compliance of the patient due to his psychiatric disorder. He was discharged in postoperative day (POD) 42 in good clinical conditions, on oral-only diet.*

*Colonic interposition through the retrosternal route after esophagectomy is a technically demanding procedure, associated with high morbidity and mortality, but it is a feasible option when the stomach is not available for reconstruction.*

**KEY WORDS:** Esophageal reconstruction - Left colon interposition - Esophageal perforation - Case report.

### Introduction

Esophageal perforation and caustic injuries are the current indications for esophagectomy in emergency. A cervical esophagostomy has to be performed during the first surgery in order to allow staged reconstruction, which can be referred to experienced centres. The treatment of choice for esophageal reconstruction is esophagogastrostomy with gastric tubulization. Esophageal reconstruction with colonic or jejunal segment is a treatment of second choice when the stomach is injured or not adequate for use, such as in case of previous gastric surgery or esophagogastric damage (1-4). These re-

constructions are technically demanding, both in case of colonic interposition and jejunal graft. Moreover, they are associated with a high rate of morbidity and mortality, mainly due to insufficient blood supply and therefore anastomotic leak or stricture and graft ischemia (5-10). When a cervical anastomosis is needed and the stomach is not available, as usually required for staged reconstruction after esophagectomy in emergency cases, admitted techniques are left or right colonic interposition, “supercharged” jejunal interposition or free jejunal graft (2, 3, 8, 11, 12). Among colonic reconstructions the left colon has the advantage to have smaller diameter, more length, better vascularization and bolus-propulsion ability than the right colon. These characteristics are associated with better long-term and functional outcome (6, 13). Jejunal reconstructions consist of free or “supercharged” jejunal graft, which

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both provide vascular sutures to connect the local vessels in the neck and/or the thoracic region, in order to bring adequate vascularization to the graft. These interventions are technically challenging, moreover they are affected by additional complications related to microvascular anastomoses (7).

To date, there is no consensus on the optimal route of reconstruction after esophagectomy with cervical anastomosis (8). Posterior mediastinum is the most common route in case of esophagectomy with simultaneous reconstruction. Retrosternal route is preferred in case of emergency esophageal diversion and staged reconstruction, because in these cases the posterior mediastinum is usually obliterated (14, 15).

We report the case of a staged reconstruction after esophagectomy in emergency, using a left colonic interposition through the retrosternal route.

## Case report

A 51-year-old male patient, affected by schizoid disorder with depressive psychosis, ingested two metallic razor blades for suicide intent. He arrived in emergency in an outside hospital, where he underwent endoscopic removal of the blades. This procedure was followed by esophageal perforation, immediately repaired with endoscopic clips. The conservative treatment with antibiotics and parenteral nutrition failed, so the patient underwent multiple surgical interventions to solve mediastinitis and thoracic sepsis. First of all, thoracotomy with toilette and total esophagectomy were performed. In a second look a cervical esophagostomy and nutritional jejunostomy were performed in order to allow a staged reconstruction. Another intervention with toilette and drainages positioning was necessary to definitively solve thoracic sepsis. Nutritional improvement was considered to be necessary for the complete recovery of the patient. In anticipation of the staged reconstruction, colonoscopy was performed to exclude malignancy and a little adenomatous polyp 15 mm in diameter was excised. Three months after the latest operation, the patient was moved to our ward for esophageal reconstruction.

We planned a reconstruction with gastropasty or alternatively with coloplasty, but the decision was taken intraoperatively. The preoperative assessment did not provide for angiography of the mesenteric vessels,

that we don't routinely perform in preparation for coloplasty.

The patient had no major comorbidities, but he had a poor-controlled schizoid disorder that complicated his management before and after surgery.

We chose the abdominal and cervical access. At exploration the stomach was found to be not adequate for reconstruction because of firm adherences with pancreas and diaphragm, therefore we opted for left colonic interposition. The entire colon was mobilized after accurate adhesiolysis of the several inflammatory adherences. The inferior mesenteric vein (IMV) was sectioned at the inferior border of the pancreas to allow the left colon to ascend in cervical position. A clamping test was performed to verify efficiency of the anastomoses between the left and middle colic artery (Riolano and Drummond arcades). After that, the distal transverse colon and the descending colon were sectioned, with maximum respect for the arterial vascularization. The cervical esophagostomy was isolated from superficial and muscular planes and the esophageal stump prepared for anastomosis.

The left colon was transposed to the cervical position through a retrosternal route previously developed with the use of Savary® tubes of increasing diameter. Two totally mechanical anastomoses were performed to connect the coloplasty in isoperistaltic position. A termino-lateral esophago-colonic-anastomosis was reinforced with single stitches in absorbable monofilament. A latero-lateral colo-gastric anastomosis was performed using the anterior gastric wall instead of the posterior one, because of firm adherences with the surrounding organs. The colonic recanalization provided a mechanical latero-lateral anastomosis. The jejunostomy was checked and left in place and three drainages positioned.

During the postoperative course the patient stayed in Intensive Care Unit until POD 9, because of acute respiratory insufficiency due to complete right pulmonary atelectasis. In POD 6 a mucous collection was drained after the removal of the cervical drainage. We positioned a Penrose® drainage in the cervical wound, removed only in POD 30 because of suppuration.

When the patient was extubated he demonstrated poor compliance with the therapies. In fact, he refused enteral nutrition, his psychopharmacological therapy and the radiologic control with Gastro-

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grafin® that we usually perform in POD 7 to 10. Therefore the patient underwent parenteral nutrition until oral nutrition was started. He did not refer vomiting nor dysphagia, so he started with oral liquids in POD 16, but solid food was given only in POD 31. In fact, he continued to refuse collaboration until compensation of his psychiatric disorder. After modification of his psychiatric therapy, the patient showed a better attitude thanks to the improvement of his mental state. This changing allowed us to perform a radiologic control of the anastomoses, which demonstrated only a slight stenosis of the esophago-colonic-anastomosis, without evidence of dehiscence (Figure 1). The patient was discharged in POD 42 on oral-only diet, when the psychiatric rehabilitation clinic where he was hospitalized gave us the possibility to move him.

## Discussion

There are several options for reconstruction after esophagectomy, but coloplasty is the most common technique when the stomach is unavailable for use, such as in case of previous gastric resection or esophago-gastric damage. In the literature this procedure is associated with good long-term and functional outcome (2, 3, 11, 16-18).

If a cervical anastomosis is needed it is also possible to perform a free or "supercharged" jejunal graft (7). These techniques have been developed because the limited lengthiness of the mesentery does not allow a pedicled jejunal segment to ascend in the cervical region without tension, preserving the vascularization. The jejunum has several advantages as substitute of the esophagus: it has a similar luminal size, intrinsic peristalsis, it is usually free of disease (haemorrhage and malignancy) and may not undergo important senescent lengthening as the colon does (7). Moreover, the supporters of jejunal interposition argue that all colonic anastomoses are colonized by enterobacteria, which can cause pneumonia in the postoperative course. Finally, in the literature coloplasty is associated with higher rates of late complications than jejunal interposition, such as stenosis and graft redundancy (5, 11, 12). Nevertheless, a free or "supercharged" jejunal graft requires a complex operation with microvascular anastomoses, which could further increase the risk of morbidity and

mortality of the reconstructive surgery after esophagectomy (7, 19).

There is not a gold standard technique for coloplasty, each one having some advantages. Surgically, the left colon is often preferred to the right colon because of the smaller diameter, increased length, better blood supply and bolus-propulsion activity (6, 12). On the other hand, right coloplasty provides also interposition of the terminal ileus, which is anastomized with upper esophagus. Esophagoenteral anastomosis is a suture between two conduits of similar diameter and the preservation of ileocecal valve reduces biliary reflux (6). The pedicled colonic segment is usually passed through orthotopic (posterior mediastinal) or retrosternal route. The orthotopic position is more physiological, it is the shorter and safer route and is associated with a lower risk of anastomotic complications. Nevertheless, a retrosternal tunnel can be a last resort when the posterior mediastinal route is obliterated or not technically feasible (8, 14, 20).

In the case that we describe, we performed a coloplasty because the stomach was involved in the inflammatory complications due to the previous esophageal perforation.

The patient was 51 years old and did not have comorbidities that could specifically compromise colonic vascularization. Therefore we decided not to perform a preoperative angiography in preparation for a possible "salvage" coloplasty. In fact, as demonstrated in the literature, there is a similar incidence of anastomotic ischemic complications in patients who undergo or not to preoperative vascular assessment (21). Nonetheless, a clamping test was performed intraoperatively to determine if the anastomosis between the superior and inferior mesenteric artery (Riolano arcade) was preserved. We determined that the left colon had good vitality and adequate vascularization, so we proceeded with the section of the descending and the transverse colon, as long as we needed it. The technique was modified according to the specific case. We usually prefer the posterior mediastinal route in case of esophagectomy with simultaneous reconstruction. In this case the posterior mediastinum was unavailable because of inflammatory and iatrogenic adhesions, therefore we decided to use the retrosternal route.

Moreover, the firm adhesions related to esophageal perforation convinced us to perform the

colo-gastric anastomosis on the anterior gastric wall instead of the posterior one routinely used. In fact, it was of primary importance to us to avoid the risk of iatrogenic injuries to abdominal organs during adhesiolysis.

The patient had good clinical and functional outcome, despite of his psychiatric comorbidity that complicated his management. In fact, the poor compliance of the patient delayed the start of oral intake and his discharge. It was not possible to perform a radiologic control of the anastomoses before starting oral intake. Thus, we decided to start with oral liquids based on the good clinical course. The patient never referred vomiting or dysphagia but he started with solid intake only in POD 31, because he refused oral diet until compensation of his psychiatric disorder. Furthermore, the cervical wound complication with evidence of mucous output in the early postoperative days brought us to be particularly careful in the management of the patient. Despite an absence of clinical signs for anastomotic complications we performed a radiologic control prior to his discharge, in order to document no evidence of anastomotic leak. The discharge of the patient was further delayed because we waited ten days for an available bed in psychiatric rehabilitation clinic.

## Conclusions

Reconstructive surgery after esophagectomy is a challenging surgery, with high morbidity and mortality. The gold standard technique is esophagogastrostomy with gastric tubulization, but if the stomach is not available there are several options for reconstruction, each one having some advantages. In our experience, isoperistaltic left colonic interposition is a good option for esophageal reconstruction, associated with favourable postoperative and functional outcome. Nevertheless, this kind of surgery has always to be tailored on the patient and modified according to the specific case (Figure 1).

### Conflict of interest statement

Dr. Bizzoca has nothing to disclose. Dr. Pisicchio has nothing to disclose. Dr. Torchia has nothing to disclose. Dr. Vincenti has nothing to disclose.

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Figure 1 - Postoperative radiologic control of anastomoses.

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