

Historical Overview

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“Nothing illumines the human mind more than the perusal of history”

There is no greater saga in the history of mankind than the epic of medicine. A precise understanding of the nuances of a disease process is dependent on the knowledge of its etiology, its evolution, its progress and finally the therapy response for its control and cure. The perusal of history therefore, is an important and vital factor in assessing and understanding the intricacies of a given disease. Lessons from history are therefore, a major source of inspiration, helps to inculcate a sense of humility, makes one realize the limits of medicine and the fact that any truth is relative, never absolute.

It is interesting to know that esophageal cancer dates back to ancient Egyptian times, Circa 3000 BC.¹ It was described in China over 2000 years ago as YE GE, which means dysphagia and belching.² It was known to be a fatal disease and it was believed, “Those discovered to suffer from esophageal cancer in the autumn, will not live through the next summer.”²

GALEN in the 2nd century described “Fleshy Growths” as a cause of obstruction of the esophagus with cachexia and a fatal outcome.² The history of development of esophageal resection has thus been long and difficult. “The tales of men repeatedly

losing to a stronger adversary yet persisting in the unequal struggle until the nature of the problem became apparent and the war was won.”³

The progress to safe and satisfactory surgery and anastomosis was slow and arduous. The reasons for this are strong:

1. The esophagus has a deep anatomic location.
2. It traverses three anatomic areas, viz. the neck, the chest and the upper abdomen.
3. Profuse lymphatic supply owing to its length is conducive to frequent lymph nodal metastasis to the neck, the chest and even the abdomen. The author has the experience of a histologically proven metastasis in the right inguinal region from an esophageal cancer.
4. The absence of a serosal coat.
5. The absence of serosa is compensated by a strong esophageal mucosa and an adequate muscle coat.
6. The anastomosis is often located in areas where postoperative infection is dangerous and can spread rapidly as in the chest or the upper abdomen.

The earliest report on esophageal intervention is credited to the Mayo brothers who

published their experiences on lye strictures of the esophagus, esophageal bougienage and the management of impacted foreign body in the esophagus.⁴ Dr. Henry Ellis Jr. spent 20 years at the Mayo Clinic and worked on the anatomy and physiology of the organ. The early history of esophageal resection is prolonged and tinged with frequent failures and only occasional successes. Czerny, Torek, Ivor Lewis and many other outstanding surgeons of the time struggled to unlock the mystery of esophageal cancer and its surgical treatment.

ED Churchill wrote in 1960⁵ "Surgeons have travelled a long road to bring their craft to its present position. The road can be measured by milestones of triumph and progress; also by tombstones of tragedy and prejudice. The journey cannot be described as a particularly sentimental one but rather as a struggle in which stern realism has usually obscured any elements of romance. Only the words of those who have lighted the way remains to show the romance of surgery. They

are the words of earnest men, the strength of those convictions exceeded the techniques available for its expression. These men stand poles apart from today's 'bright boys' who are so facile in wielding the techniques they have inherited."

Resection was first carried out for cervical esophageal growths, then for the lower end growth (including the cardia) and finally thoracic esophageal growths. The prolonged saga of esophageal resection is divided into three distinct eras:⁶

- 1877–1912: No attempt, to restore continuity between pharynx and stomach (except for carcinoma of the cervical esophagus)
- 1913–38: Continuity restored usually at a subsequent operation, by a presternal tube of skin, stomach, jejunum or an external rubber tube
- 1938 onwards: Excision and immediate restoration of continuity in neck or chest.

Table 1.1 Timeline for esophageal surgery

Year	Author	Event
1870	Theodor Billroth ⁷	Cervical resection and anastomosis in dog
1877	Czerny ⁸	First esophageal resection for a cervical tumor-local excision and a feeding cervical esophagostomy
1886	Mikulicz ⁹ (Pupil of Billroth)	Reconstructed the cervical esophagus by use of skin flaps (11 months survival)
1888	Nassiloff ¹⁰ (St. Petersburg)	Extrapleural route (to reduce risk of pleural infection) for upper thoracic esophageal resection. Approached from posterior part of the thorax by resecting four ribs in cadavers
1891	Von Hacker ¹¹	Replaced segment of the cervical esophagus in dogs by a horizontal bridge of skin. Unsuccessful in a patient
1898	Ludwig Rehn ¹² (Germany)	First surgeon to approach esophagus through the chest by an extrapleural route
1901	Dobromyslov ¹³	First successful transpleural resection with immediate restoration of continuity carried out in dogs
1903	Mikulicz and Fauré ¹⁴	Attempted a left transpleural approach before Czery but without success
1907	Roux ¹⁵ (Lausanne)	Used a loop of jejunum as the lower part of a presternal conduit, the upper part made from a skin tube

Contd...

Table 1.1 Timeline for esophageal surgery (Contd...)

Year	Author	Event
1908	Voelker ¹⁶ (Heidelberg)	First successful resection of a carcinoma at the lower end of the thoracic esophagus by the abdominal route. Left subcostal incision. The esophagus pulled down into the abdomen. The carcinoma resected and an esophagogastric anastomosis created
1911	Sir Arbuthnot Lane ¹⁷ (Guys Hospital)	Successfully resected cancer of the upper esophagus and back of the larynx, continuity restored by a skin flap
1911	Kelling Dresden ¹⁸	Used the transverse colon to replace the esophagus. This staged operation was almost successful
1913	Torek ¹⁹	The first successful resection of a mid-esophageal carcinoma by a left transpleural approach
1913	Denk ²⁰	First transhiatal esophagectomy in cadavers
1913	Zaaijer ²¹ (Leiden)	Performed two successful staged transpleural resections of cancer at the lower end of the esophagus
1913	Willey Meyer ²²	Used the greater curvature of the stomach to make a long tube to reach high in the chest. This was used to bypass an inoperable carcinoma and also to replace the lower esophagus after resection
1922	Kummell ²³	First attempt at gastric transposition
1933	Grey Turner ²⁴	Transhiatal esophagectomy
1933	Oshawa ²⁵ (Kyoto)	Performed the first successful transthoracic esophagectomy and primary esophagogastric anastomosis for esophageal cancer
1934	Heneage Ogilvie, ²⁶ O'Shaughnessy and Raven ²⁷	Published a masterly paper on the techniques for surgical exposure of the esophagus
1938	Garlock ²⁸	Three consecutive successful resections with the Torek technique
1946	Ivor Lewis ²⁹	Ivor Lewis esophagectomy
1978	Orringer ³⁰	Reintroduced transhiatal esophagectomy after Turner's dismal outcomes in 1933
1978	Belsey ³¹	Advocated the use of ascending, transverse and descending segments of colon for esophageal replacement
1979	McKeown ³²	Three phase total esophagectomy operation with anastomosis in the neck

*Franz Torek (1861–1938)*³³ is one of the early pioneer surgeons in thoracic surgery (Fig. 1.1). In 1913 he performed the first thoracic esophagectomy for a mid-esophageal cancer, on a 67 years old woman, who survived for 12 years (Fig. 1.2). The proximal end of the esophagus was brought out through a cervical incision; the cancer resected and the

remainder of the esophagus was tunneled under the skin to make an esophagostomy on the anterior chest wall at the 2nd interspace. A gastrostomy was also performed and the patient was fed through the gastrostomy tube for the first 8 postoperative days and later received nutrition orally. The meal passed from the proximal esophageal stoma through

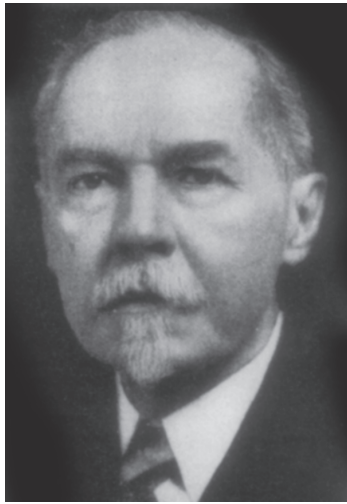


Fig. 1.1: Franz Torek (1861–1938)

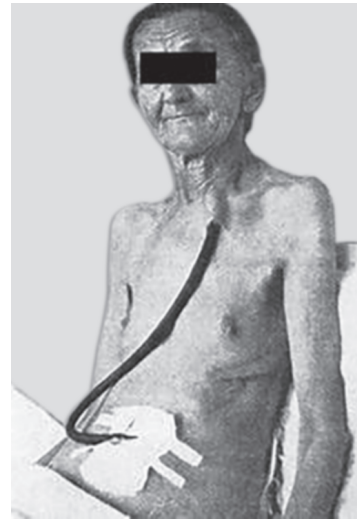


Fig. 1.3: Franz Torek's patient who had undergone the first successful resection of a carcinoma of the middle third of the esophagus in 1913. The meal passed from the proximal esophageal stoma through an external tube to the gastrostomy

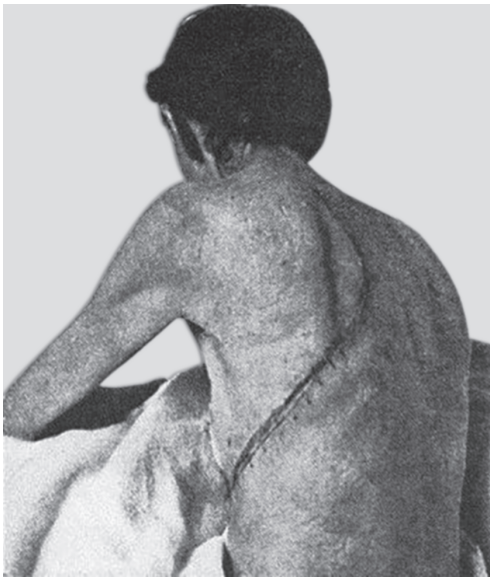


Fig. 1.2: Cachectic lady (due to disease) with an abdomino-thoracic incision after completion of esophageal resection. Incision was marked with silver nitrate the day before the operation

and his contributions, Dr. Torek will be remembered and be an inspiration to those who follow after. He was one of America's great surgeon." Torek operation was reported from 1936 to 1943 by Muir, Alison, Franklin and Brock.³⁴

Ivor Lewis (1895–1982) (Fig. 1.4): In August 1944, the Welsh surgeon described a two stage esophagectomy including a laparotomy to



Fig. 1.4: Ivor Lewis (1895–1982)

an external tube to the gastrostomy (Fig. 1.3). The other way was to create a presternal tube of skin, stomach, jejunum or colon to restore continuity. Torek's operation was a major surgical breakthrough proving that esophageal cancer could be cured surgically; Carl Eggers wrote in his obituary: "Because of his personality, his sterling character, his work

mobilize the stomach followed by a right sided thoracotomy and an immediate right intrathoracic gastroesophageal anastomosis by pulling up the mobilized stomach. This involved two standardized incisions. The Ivor Lewis procedure gained popularity and is currently the most commonly utilized approach for mid-esophageal resections worldwide.²

Further evolution of surgical techniques has led to the description of a hybrid, minimally invasive and a robotic approach.

CHEMORADIOTHERAPY FOR ESOPHAGEAL CANCER

Since the beginning of the 20th century, radiotherapy and surgery have played important roles for the treatment of esophageal cancer. Exner³⁵ first described the treatment of esophageal cancer with radium in 1904. Adding cytotoxic chemotherapy to radiotherapy for additive or synergistic effect was described as early as 1968.³⁶

The Indian Scenario

Though published data on esophageal resection surgery is hard to find in India, the earliest published report about resection of the esophagus is from TATA MEMORIAL HOSPITAL, in mid 1940's by the late Dr. Ernest Borges and Dr. Jussawalla. By the early 50's esophageal resections were frequently performed in Bombay and larger institutes in Kolkata and major medical centers in the south (Adyar, Coimbatore, Vellore and other centers). Currently, many centers in India perform esophageal resection for cancer, as it is an extremely common disease. However, most patients present late when effective surgery is not feasible and only palliative relief is offered by chemoradiotherapy and supportive treatment.

REFERENCES

1. Guy D Eslick. Esophageal Cancer: A Historical Review.
2. Raymond Hunt. Historical Review: Surgical treatment of carcinoma of the esophagus. *Thorax* 1991;46:528–35.
3. Elmslie RG. Perspectives in the development of esophageal surgery. In: Jamieson GG, (Ed.) *Surgery of the esophagus*. London: Churchill-Livingstone, 1988:3–8.
4. W Spencer Payne, Arthur Olsen—The Esophagus.
5. Churchill ED. In: Foreword to Hochberg LA. *Thoracic Surgery before the 20th century*. New York: Vantage Press, 1960.
6. Historical Review: Surgical treatment of carcinoma of the esophagus. *Thorax* 1991;46:528–35.
7. Billroth CAT. Über die resektion des esophagus. *Arch Klin Chir* 1871;13:65–9.*
8. Czerny V. Neue Operationen; resektion des esophagus. *Zentr Chir* 1877;4:433–4.*
9. Mikulicz J Von. Ein Fall von Resektion des Carcinomatosen Esophagus mit plastischen Ersatz des exedierten Stuckes. *Prag Med Wochenschr* 1886;11:93–4.*
10. Nassiloff II. Esophagotomia et resectio oesophagi endo-thoracica. *Vrach St Peterberg* 1888;9:481–2.*
11. Hacker Von. Über Resektion und Plastik am Kebsabschnitt der Spieserohre, insbesondere beim Carcinom. *Arch Klin Chir* 1908;87:257–323.*
12. Rehn L. Operationen an dem brustabschnitt der speiserohre. *Verh Dtsch Ges Chir* 1898;21; 448–70.*
13. Dobromyslov WD. Ein Fall von transpleuraler Osophagotomie im Brustabschnitte. *Zbl Chir* 1901;1:18.*
14. Fauré JL. Cancer de la portion thoracique de l'oesophage. Extirpation du neoplasme par la voie mediastinin posterior droite. Combinée a une incision cervicale. *Bull Mem Soc Chir* 1903;29:122–34.*
15. Roux C. L'Esophago-jejuno-gastrome, nouvelle operation pour retrecissement infrachisable de l'oesophage. *Semaine Méd* 1907;27:37.*
16. Voelcker. Über Extirpation der Cardia wegen Carcinoms. *Verh Dtsch Ges Chir* 1908;37; 126–9.*
17. Lane WA. Excision of a cancerous segment of the esophagus: restoration of the esophagus by means of a skin flap. *Br Med J* 1911;1:16–7.
18. Kelling. Esophagoplastik mit hilfe des quer-kolon. *Zbl Chir* 1911;38;1209–12.*

19. Terek F. The first successful case of resection of the thoracic portion of the esophagus for carcinoma. *Surg Gynecol Obstet* 1913;16:614–7.
20. Denk W. Zur Radikaloperation des Oesophaguskarzinoms. *Zentralbl Chir* 1913;40:1065–8.*
21. Zaaier JH. Erfolgreiche transpleurale Resektion eines Cardia-carcinoms. *Beitr Klin Chir* 1913;83:419.*
22. Meyer W. Esophagoplasty. *Ann Surg* 1913;58:289–95.
23. Kummell HJ. Ueber intrathorakale oesophagus plastic. *Beitr Klin Chir* 1922;126:264–77.†
24. Turner GG. Some experiences in the surgery of the esophagus. *N Engl J Med* 1931;205:657–74.
25. Oshawa T. The surgery of the esophagus. *Arch Jap Chir* 1933;10:604–95.
26. Ogilvie WH. Intrathoracic reconstruction of lower esophagus. *Br J Surg* 1938;26:10–22.
27. O'Shaughnessy L, Raven RW. Surgical exposure of the esophagus. *Br J Surg* 1934;22:365–77.
28. Garlock JH. The surgical treatment of the thoracic esophagus. *Surg Gynecol Obstet* 1938;66:534–48.
29. Lewis I. Surgical treatment of carcinoma of the esophagus. *Br J Surg* 1946;34:18–31.
30. Orringer MB. Transhiatal esophagectomy without thoracotomy for esophageal carcinoma. In: Delarue NC, Wilkins EW, Wong J, (Eds.) *International trends in general thoracic surgery*. Vol 4. St Louis: Mosby, 1988:200–9.
31. Belsey RHR. Reconstruction of the esophagus with left colon. *J Thorac Cardiothorac Surg* 1965;49:33–55.
32. McKeown KC. The surgical treatment of carcinoma of the esophagus. *J R Coll Surg Edinb* 1985;30:1–14.
33. Attila D, Seymour Schwartz. Franz John A. Terek. *Ann Thorac Surg* 2008;85:1497–9.
34. Eggers C, Franz JA Terek 1861–1938. *Ann Surg* 1939;110:797–9.
35. Exner A. Veber die behandlung von oesophagus karzinomen mit ardiunstrahlen. *Wien Klin Wochenschr*. 1904;17:514.‡
36. Neuner G, Patel A. Chemoradiotherapy for esophageal cancer. *Gastrointest Cancer Res*. 2009 Mar–Apr;3(2):57–65.

*References 7–16, 18, 20, 21 cited from Raymond Hurt. Historical review: Surgical treatment of carcinoma of the esophagus. *Thorax* 1991;46:528–35.

†Reference 23 cited from Vishesh J, Shilpa S. Transposed intrathoracic stomach: Functional evaluation. *African Journal of Pediatric Surgery* 2012;9;3:210–6.

‡Reference 36 cited from G Neuner, A Patel. Chemoradiotherapy for esophageal cancer. *Gastrointest Cancer Res* 2009 Mar–Apr;3(2):57–65.