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Trans-oral irrigation for the management of cervical esophagogatric anastomotic leak

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Summary
Over a period of 8 years, 15 of the 65 patients who had transhiatal esophagectomy (THE) for esophageal diseases and cervical esophagogastrostomy had cervical oesophagogastric anastomotic leak. Seven of the 18 patients (38.9%) with corrosive esophageal strictures (CES) due to acid burns had anastomotic leaks while 2 out of 6 patients (33.3%) and 6 out of 41 patients (14.6%) were the incidences of anatomotic leaks among alkali burnt and carcinoma of the esophagus. Anastomotic leaks were more commonly associated with surgery for CES. They were managed by trans-oral irrigation with water after ingestion of either soft/solid diet or high protein, high carbohydrate fluid diet along with adequate jejunostomy feeding. The age of the patients ranged between 5 to 65 years (mean 38.8 ± 15.7 year).
Anastomotic leaks were diagnosed between 3rd to 10th postoperative day (mean 7.1 ± 2.6 day). The period of trans-oral irrigation before closure of leakage ranged from 2 to 14 days (mean 6.1 ± 2.9). In 12 patients (80%) anastomotic leakage closed within 5 days, (mean 3.9 ± 1.0). Two weeks after closure, all the patients had bouginage and every two weeks for another 3 dilation. Four of the 15 patients needed repeated two monthly dilation for 8 to 12 months.There were no other complications nor mortality in this study. There was psychological acceptance of this minimally invasive procedure.

Keywords: *Trans-oral, irrigation, anastomotic leak.*

Résumé
Au cours d'une perode de 8 ona, 15 des 65 malades qui ont en l'esophagectomie transhiatale (ETH) des maladies de l'oeusophage et l'esophagogastrostomic cervicale avaient une fuite anastomotique oeusophageogastrique. 7 des 18 patients [38,9%] avac des stritures corrosif de l'osusophage (SCE) causes par les bruluires d'acide avaient des fuites anastomotiques alors que 2 sur 6 des maladies [33,6%] et 6 sur 41 [14,6%] etaient les incidences des fuites anatomotique parmi les brulures d'alkali et la carcinomic de l'osusophage. Les jites anastomotiques etaient plus communement associees a la chirurgie de SCE. Ceci etait pris en charge par l'ingestion soit de repas doux ou solide, soit de proteine elevee, soit de fecilents fluids avec une alimentation adequate de jejunostomie. Les maladies etaient ages de 5 a 65 ans [moyenne 38,8 =15,7 ans].

Les fuites anastomotique etaient diagnostiquees entre le 33eme et le 10eme jour postroperatoire [moyenne 7,1 + 2,6 jours]. La periodezxc de l'irrigation trans – orale avant la fermeture de la fuite allait de 2 a 14 jours (moyenne 6,1 + 2 9). Chez 12 patients [80%] la fuite anastomotique n'est fermee au bout de 5 jours, (moyenne 3,9 +1,0). Deux semaines après la fermetre, tous les maladies ont en le bongimage et tous les trios semaines pourune autre 3 dilatation. 4 des 15 patients ont eu besoin de dilatations repetees an bont de chaque deux mois pour une periode de 8 a 12 mois. Il n'yavoit pas d'aoutres complications, ni de mortalite dans cette etude Il ya eu acceptation psychologique de cette procedure invasive minimale.

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Introduction

The aim of the surgical treatment of an esophageal perforation is to halt and reverse the chain of events produced by the massive entry of bacteria and chemically active material into the surrounding tissue that so rapidly leads to uncontrollable sepsis [1,2]. Cervical esophagogastic anastomotic disruption following total thoracic esophagectomy generally does not carry the disastrous consequences of an intrathoracic anastomotic leak [3]. In the past 10 years, in the cardiothoracic surgical unit of the University College Hospital, Ibadan, Nigeria, there has been an increase in the use of transhiatal esophagectomy (THE) and cervical esophagogastrostomy for disease of the intrathoracic esophagus. Optimal management of anastomotic leaks in this location merits further discussion [4]. This report reviews our experience with trans-oral irrigation (TOI) in patients with cervical anastomotic leaks. This is a modification of the trans-esophageal irrigation used in the treatment of mediastinitis produced by esophageal rupture [4]. The site of leakage is used to provide a useful access to the infected are for fluid irrigation and debridement to accomplish thorough cleaning of the area thereby enhancing healing. This adaptation constitutes to us a non-invasive, simple inexpensive method for the management of cervical anastomotic leak.

Materials and methods

During the past eight years esophagectomy without thoracotomy was performed by two teams of surgeons as described previously [5]. There was immediate placement of the mobilized stomach in the posterior mediastinum and cervical esophagogastrotomy. All the patients had a rubber drain placed at cervical operation site and exteriorized through a wide skin stab incision. The patients have a nasogastrc tube left in place as a stent and for gastric decompression (see figure). The nasogastric tube was left in situ until oral intake started. All these patients had perioperative, broad spectrum, antibiotics. Preoperative adequate nutritional resuscitation was done via a feeding gastrostomy. Postoperatively, jejunostomy feeding of high protein, high carbohydrate fluid diet was commenced as soon as bowel sound returned. Drain site dressings were observed and changed daily. On the 10th postoperative day all patients without anastomotic leak had methylene blue drink to diagnose leakage from the anastomotic site and a barium swallow to document the status of the anastomotic site.

When leakage started before the 10th postoperative day, clear water was started orally with the nasogastric tube in-site while normal jejunostomy feeding was continued according to dietary requirements. When anastomotic leakage was noticed at 10th postoperative day, the patients were commenced orally on any type of normal diet the patient desired, followed by oral clear water intake to irrigate the site of leakage. Nasogastic tubes and neck drains were removed when anastomotic site had healed

completely as evidence by lack of effluent from neck drain after clear fluid intake. In patients with no anastomotic leakage at 10th postoperative day, the nasogastric tube was removed but neck drains were left until oral intake was fully established.

All the patients in this series had esophageal bouginage two weeks after evidence of closure of anastomotic leak. They were discharged and subsequently had variable numbers of dilations. Initially esophageal dilation were done every 2 weeks for 3 dilations. Subsequent bouginage depended on individual response, either to have monthly dilation or monthly dilation to progress to two monthly dilations.

Chi squared test was carried out to determine the significance of the difference in occurrence of the leakage in the different esophageal conditions treated. The diference in occurrence of leakage was considered significant if P value is less than or equal to 0.05.

Results

Sixty-five patients with esophageal obstruction had THE and cervical esophagogastrostomy between 1989 and 1997. Forty one patients (63.1%) had carcinoma of the esophagus, 24 patients (36.9%) had corrosive esophageal structure (CES).

Eighteen (75%) of these CES were due to acid burns while the remaining 6 (25%) were due to alkali burns.

Fifteen of these patients (23.2%) developed anastomotic leak. Seven of the 18 patients [38.9%] with CES due to acid burns had anastomotic leaks while 2 out of 6 patients [33.3%] and 6 out of 41 patients [14.6%] were the incidences of anastomotic leaks among alkali burnt and carcinoma of the esophagus. There was no significant difference in the occurrence of leakage between patients with acid burn and alkali burn P = 0.60. The difference in occurrence of leakage in acid burn compared to carcinoma of the oesophagus was statistically significant, P = 0.04 (Fisher exact test).

The difference in the occurrence of leakage in alkali burn compared to carcinoma of the oesophagus was not significant, P = 0.26 (Fisher exact test). From the percentages of anastomotic leaks, leakages were more commonly associated with surgery for CES.

These fifteen patients who had cervical esophagogastic anastomotic leak ahd trns-oral irrigation (TOI) of the area of leakage, the ages of the patient ranged between 5 and 65 years [mean 38.8 ± 15.7 years], there were 8 males and 7 females. The distribution is as shown on the Table. Eleven of the anastomotic leakages [73.3%] were diagnosed by simple observation of drain site dressing in all patients methlene blue confirmed leakage and barium swallow located site and size of disruption. Anastomotic leaks were diagnosed between the 3rd 10th postoperative day (mean 7.1 ± 2.6 days).

Table Review of 15 cases of cervical anastomotic leak

Patient No	Age (Years)	Sex	Primary esophageal Pathology	Postoperative day when anastomic leak was diagnosed (days)	Period of trans-oral irrigation (days)
1	21	F	Corrosive esophageal structure (CES) of upper 2/3 of thoracis esophagus (ACID)	4	3
2	28	F	CES lower cervical and upper 2/3 thoracic esophagus (ACID)	8	5
3	25	F	CES lower 1/2 thoracc esophagus (ACID)	10	4
4	32	F	CES lower cervical and upper thoracic esophagus (ACID)	10	3
5	26	F	CES, Multiple (ALKALI)	7	14
6	35	M	CES, Multiple (ALKALI)	3	5
7	36	M	CES whole of thoracic esophagus	6	4
8	24	M	CES lower thorasis esophagus	4	5
9	5	M	CES, whole lenght of esophagus	3	5
10	49	F	Middle 1/2 thorasis ca	8	9
11	61	F	Middle 1/3 thorasis ca	10	3
12	45	M	Middle 1/3 thorasis ca	8	2
13	50	M	Lower 1/3 thorasis ca	9	3
14	60	M	Middle 1/3 thorasis ca	10	5
15	65	M	Lower 1/3 thorasis ca	6	7

ACID = Acid burns, ALKALI burns, MULTIPLE + Multiple strictures Ca = carcinoma

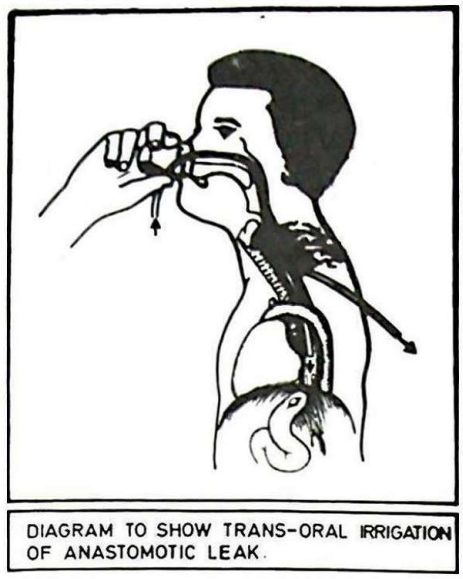

Fig
Trans-oral irrigation of cervical anastonomic site.
A pyloromyotomy when performed is also shown

Eleven of the leaks (73.3%) were diagnosed before the 10th day while 4 (26.7%) were diagnosed by the 10th day. The period of trans-oral irrigation before closure ranged between 2 and 14 days (mean 6.1 ± 2.9). In twelve (80%) trans-oral irrigation resulted in closure of cervical anastomotic leak within five days (mean 3.9 ± 1.0). The anastomotic leak in patient No. 5 which closed after 14 days of TOI was because gastric anastomosis was to fibrotic cervical esophageal stump. This was done to avoid gastro-pharyngeal anastomosis. Patients Nos. 10 and 15 were operated rather early before "adequate" nutritional resuscitation was achieved because of suppurative lung disease consequent upon esophageal obstruction. Adequate postoperative care with broad spectrum antibiotics, postural drainage and nutritional support achieved treatment of the esophageal lung.

All the patients were dilated 2 weeks after clinical evidence of closure of leak, and all had three dilations at 2 weekly intervals after the initial dilation. Eleven had monthly dilations with satisfactory outcome. Subsequent dilations were earned by 4 patients and it was every two months for 8 to 12 months. These were patients No. 2, 7, 9 and 15. There were no other complications nor mortality in this study. The period of follow up, which ranged between 4 months and 7 years showed satisfactory nutritional status in all the patients.

Discussion

The technique of esophagectotmy (transhiatal esophagectomy) performed without thoracotomy and a cervical esophagogastrostomy has become the operative technique we use for the management of both benign and malignant esophageal diseases [6,7]. The cervical anastomosis has the advantage of less disastrous consequence incase of disruption. We wait till 10th postoperative day to objectively test anastomotic integrity because from experience, most of the anastomoses were not fully healed the 6th to 7th day [6]. We also found that surgery for CES was more attended by higher incidence of anstomotic leaks than surgery for carcinoma of the esophagus. This is most probably related to the mural injury inflicted by the corrosive agents on the esophagus [8, 9, 10]. The mural injuries caused by alkalis are worse than for acids [10,11] hence the attendant anastomotic leakage should be higher for surgery done on alkali burnt esophagus than for the acid burnt. Our study did not bear out this difference probably because of the fewer number of CES due to alkali burn in this study.

The common consequence of non-contained esophageal wall disruption is the accumulation of chemically active substances and bacterial products at the periesophageal space. The outcome, if not drained, would be generalized sepsis and death. This is the most rapidly fatal perforation of the alimentary tract [12]. The principle of management includes surgical closure of the disruption with of without reinforcement. To prevent further contamination of the mediastinum surgical drainage of site of esophageal disruption and defunctioning of the esophagus is usually performed [12]. Trans-oral irrigation employs the site of perforation in irrigation of the perianastomotic space, This technique is informed by similar methods (transesophageal irrigation techniques) used in the treatment of contained [4, 13,14] and more extensive [15, 16] esophageal perforation. The transesophageal irrigation technique establishes a possibility of treating the attendant mediastinitis or initial cervical infection in the presence of esophageal rupture [4]. The esophageal opening instead of acting as source of infection of the perianastomotic tissue becomes a pathway for irrigation solution that washes the nocious material out into a drain.

The nature of drainage whether passive or active seems to have influenced the prognosis in purulent mediastinitis with better result in the later [16, 17]. We used only passive drains. This was because the perianastomotic spaces drained were potential spaces and were considered clean with minimum effluent prior to anastomotic leak. Cervical irrigation drainage has been recommended for esophageal perforations above the tracheal bifurcation and passive drains were considered effective [16,17]. After onset of trans-oral irrigation the neck drains were advanced a few centimeters after the third day. This maneouvre enhanced drainage of effluent along drainage tract [4]. We did not have perianastomotic abscess in this series. It may be argued that most small cervical esophagogastric anastomotic leak like ours will heal spontaneously without this method. TOI rapidly improved the well being of the patients so treated. The nasogastric tube helped to preserve a sizeable lumen thus preventing obstruction distal to the site of leakage. If there was anastomotic narrowing from spasm or oedema or inflammation associated with a leak, the esophalgeal emptying was noticed to be unhindered in the presence of the nasogastic tube. What is achieved by dilating the esophagus in similar circumstances in another series [3] is passively attained by the presence of nasogastric tube in the series.

Our patients with early leakage were commenced on oral fluid (high protein, high calorie) diets followed by clear fluid irrigation while those with later leakage were allowed soft and solid diets. This policy apart from the clinical observation of psychological acceptance and improvement in morale of the patient [3] also helped to maintain anastomotic lumen around the nasogastric tube. Since the leak was localized and there was no distal obstruction, majority of what is swallowed follows the proper course. Soft and solid diets are least likely to exit through small opening hence were allowed as soon as they could be tolerated. The routine placement of jejunostomy feeding tube postoperative as we did has been considered a safe method for postoperative nutritional support [3, 5, 6].

Our experience with trans-oral irrigation in the management of cervical esophagogastric anastomotic leak has shown that most (80%) will close within five days. The attendant acceptability by the patient and minimally invasive nature of the method seems to have limited the morbidity in this group of

patients to anastomotic stricture. The attendant strictures were easily controlled by a few timely esophageal dilations. Hospital stay was considerably shortened in these patients, commensurately so was the cost of postoperative care. We consider TOI a simple inexpensive solution for the management of cervical anastomotic leaks.

References

1. Loop FI and Groves LK. Oesophageal perforation, Ann Thorac Surg. 1970; 10: 571-587.
2. Payne WS and Larson RH. Acute mediastinitis. Surg Clin North Am. 1969; 49: 999-1009.
3. Orringer MB and Lemmer JH. Early dilation in treatment of Oesophageal distruption. Ann Thorc Surg. 1986 (Nov.); 42: 536-539.
4. Orringer MB and Sloan H. Oesophagectomy without Thoracotomy for Corrosive Oesophageal Stricture. J Thorac Cardiovasc Surg. 1979; 76: 643-654.
5. Gil HS and Robert WMF. Transoesophageal irrigation for the treatment of mediastinitis produced by oesophageal rupture. J Thorac Cardiovasc Surg. 1986; 91: 57-62.
6. Adegboye V.O. and Adebo OA, Brimmo IA. Oesophagectomy without Thoracotomy forCorrosive Oesophageal Stricture. Nig J Surg. 1995 (Dec.); 2(2): 62-66
7. Adegboye V.O and Adebo OA, Brimmo IA. Transhiatal Oesophagectomy as Palliative Treatment for Carcinoma of Oesophagus (In Press). E Af J. Med
8. Maull KI, Scher LA and Greenfield LJ. The Surgical Implications of Acid Ingestion. Surg Gynecol Obst 1979; 148: 895 – 898.
9. Symbas PN and Vlasis SE, Hatcher CR: Esophagitis Secondary to Ingestion of Caustic material. Ann Thorac Surg. 1983; 36: 73 – 77
10. Oakes DD and Sherck JP, Mark JBD: Lye Ingestion: Clinical Patterns and therapeutic implicThorac Cardiovasc Surg 1983; 83: 194 – 204.
11. Little AG. Esophageal Chemical burns, Foreign bodies and Bleeding: In. Baul AE Editor Glenn's Thoracic and Cardiovascular Surgery 5th Edition Vol 1 London. Appelton and Lange. 1991; 679 - 682
12. Payne WS and Ellis FH Jr. Complication of Esophageal and diaphragmatic surgery. In: Artz CP, Hardy JP, editors. Management of surgical complications. 3rd edition, Philadelphia, WB Saunders Company. 1975; 326-357.
13. Mayer JE and Jr. Murray CA, Varco RL. The treatment of oesophageal perforation with delayed recognition and continuing sepsis. Ann thorac Surg. 1977; 23: 568-573.
14. Cetrullo C and Di Nino GT. Perforazini Strumentali dell'esofago prossimale Una proposta di terapia conservative. Minerva Chir 1977; 32: 517-522.
15. Kanschin NN and Pogodina AN. Transesophageal drainage of the mediastinum in perforating mediastinitis. Vesta Khir 1983; 130: 24-27.
16. Komarov BD and Abakumov MM. Mechanical injuries of the esophagus. Zentralbl Chir. 1982; 107: 993-1002.
17. Komarov BD and Kanschin NN, Abakumor MM, Pogodina AN. Diagnosis and treatment of purulent Mediastinitis. Khirurgiia (Mosk) 1982; Apr (4): 33-37