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IMPACT OF BMI ON PERIOPERATIVE COMPLICATIONS IN PATIENTS UNDERGOING ESOPHAGECTOMY FOR ADENOCARCINOMA OF ESOPHAGUS AND GASTROESOPHAGEAL JUNCTION AT A TERTIARY CARE CANCER CENTRE – A PROSPECTIVE STUDY.

Oncology

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ABSTRACT

It is a prospective non randomised comparative study of perioperative complications in Normal BMI patients vs overweight and obese patients undergoing esophagectomy for adenocarcinoma esophagus. Obesity among asian Indians is predominantly abdominal obesity and asian Indians have more fat accumulation for similar BMI when compared to white caucasians. We conclude that though the respiratory complications and anastomotic leaks were more common among overweight and obese patients but did not reach statistical significance. Further prospective randomised studies are needed to determine the risks associated with obesity among asian indian population undergoing major surgery for cancer treatment.

KEYWORDS:

Introduction:

Over the last few decades there has been an increase in the incidence of proximal gastric and gastroesophageal junction tumors in the western population. Obesity has been attributed as an important risk factor for esophageal adenocarcinoma in western population[1].

Obesity is defined as an excessive accumulation in the body resulting in adverse effects on health of the individual. The currently recommended WHO cut offs of BMI are 18.5 – 24.9 kg/m2 for normal, 25 – 29.9 kg/m2 for overweight and > 30 kg/m2 for obesity.[2] These are based on the morbidity and mortality data from white Caucasians and may not be applicable across all ethnic groups particularly Asian Indians. Asian Indians exhibit a unique feature of obesity with increased abdominal adiposity. Also with increase in prevalence of obesity in India has a direct correlation with increase in obesity associated comorbidities i.e dyslipidemia, Type 2 diabetis mellitus, metabolic syndrome, hypertension and cardiovascular diseases. Studies have shown that the WHO cut off of definition of overweight (BMI 25- 30kg/m^2) and obesity (BMI 30-35 kg/m^2) may not be appropriate for Asian Indians.[3] Asian Indians have higher percentage body fat, abdominal adiposity at lower or similar BMI levels as compared to white Caucasians.[3] The implications of obesity on peri-operative complications in the management of localized adenocarcinoma, particularly operative risks, have not been studied systematically in asian population. Hence we designed a prospective non randomised comparative study on perioperative complications between patients with normal BMI (WHO BMI range 18.5 -24.9 kg/m^2) vs overweight (WHO BMI range 25- 29.9kg/m^2) and obese patients (WHO BMI range 30- 34.9 kg/m^2) undergoing elective esophagectomy for adenocarcinoma of esophagus and gastroesophageal junction tumors.

Materials and methods:

The study included the patients presenting to our institute with localised Adenocarcinoma of the esophagus and gastroesophageal junction (cT1- T4a, N0-N+) between August 2014 and February 2017 and esophagectomy was planned as the part of definitive treatment. Patients with severe malnourishment (BMI < 18 kg/m^2) and morbid obesity (BMI > 35 kg/m^2) were not included in the study. Preoperative presenting symptoms, medical comorbidities, height, weight, smoking and alchohol consumption history, performance status and pulmonary function test were documented.

All patients were evaluated with upper GI endoscopy and Computerised tomography assessment. Endoscopic ultrasound and FDG- PET scan were not routinely done. The patients were grouped into two groups 1) Normal BMI and 2) Overweight and obese patients. The type of oesphagectomy performed, (THE/TTE), lymphedectomy, operative duration, whether extubated at the end of procedure, intraoperative blood loss, and blood products given were noted.

All complications from surgery to discharge from hospital were prospectively documented. Respiratory failure defined as the requirement for mechanical ventilation more than 24 hours after surgery. Acute respiratory distress syndrome (ARDS) as per Berlin criteria[4], anastomotic leak defined as the presence of both clinical and radiological evidence of leak, sepsis defined as evidence of systemic inflammatory response syndrome with microbiological evidence of infection, and pneumonia defined as clear clinical and radiographic evidence of consolidation or positive sputum cultures. Statistical analysis done using SPSS version 18.

Results :

The total number of patients included in the study were 54 out of which 31 were with normal BMI and 17 overweight and 6 obese patiients. The demographic data (Table 1) shows no significant differences in the demographic profile of the two groups.

Demography	Group 1: Normal BMI (n=31)	Group 2 : Overweight and Obese (n=23)	P value
Age : Median (Range)	53 years (36 – 66 y)	59 years (44 – 79)	0.63
Male : Female	17 : 14	9 : 14	0.29
Symptoms			
Dysphagia	30 (96.7%)	20 (96.9%)	0.30
Weight loss	26 (83.8%)	17 (73.9%)	0.49
Retrosternal burning pain	10 (32.3%)	14 (60.9%)	0.053
Smoking	15 (48.4%)	9 (39.1%)	0.58
Alcohol	13 (41.9%)	9 (39.1%)	0.78
Hypertension	17 (54.8%)	15 (65.2%)	0.57
Type 2 Diabetes	14 (45.2%)	14 (60.9%)	0.28
FEV1/ FVC Mean (Range)	69 % (66-82%)	64% (60 -74 %)	0.36

Table 1 : Comparision of demographic data between Nomal BMI Patients (Group 1) and overweight and obese patients (Group 2)

Operative protocol: All the patients included in the study underwent transhiatal esophagectomy with anastomosis in the neck. Patients were extubated either at the end of surgery or within 6 – 12 hours of elective ventilation. Median time to extubation was at the end of surgery (Range 0 – 12 hours).

Patients were started on Jejunostomy trial feeds on 1st post operative day and gradually increased to full enteral feeds. Oral liquids were allowed on 5th post operative day.

Results :

Perioperative data	Group 1: Normal BMI (n=31)	Group 2 : Overweight and Obese (n=23)	P value
Blood loss :Median (Range)	500 ml (350 ml – 900 ml)	450 ml (400 ml – 1000ml)	0.49
Atelectasis	3 (9.6%)	5 (21.7%)	0.26
Pneumonia	2 (6.4%)	3(13 %)	0.64
ARDS	None	1 (4.3%)	0.42
Respiratory failure	None	1 (4.3%)	1.00
Wound complications	2 (6.4%)	2 (8.6%)	1.00
Sepsis	1 (3.2%)	2 (8.7%)	0.56
Anastomotic leak	2 (6.4%)	4 (17.4%)	0.21
Mortality (30 day)	2 (6.4%)	1 (4.3%)	1.00

Table 2 : Results- post operative recovery, perioperative complications and mortality data.

In our study results (Table 2) there was no significant difference in the mean operative duration (240 min vs 260 min) and volume of blood loss (500 ml vs 450 ml). The wound complications (6.4% vs 8.6%), sepsis (3.2% vs 8.7%) was similar in both the groups. However the respiratory complications i.e atelectasis (9.6 % vs 21.7%) and pneumonia (6.4% vs 13 %) were slightly higher in the overweight and obese patients but did not reach statistical significance. In the overweight and obese group , a case of ARDS was documented and the same case progressed to respiratory failure and death. Anastomotic leak was also slightly higher in the overweight and obese group (6.4% vs 17.4%) but not statistically significanct. The 30 day mortality were similar in both the groups (6.4% vs 4.3%).

Discussion:

The pattern of esophageal cancer in the western population has changed dramatically in recent decades, with a marked increase in the incidence of adenocarcinoma of the esophagus and esophagogastric junction. The explanation for this increase is because of various factors like obesity, chronic gastroesophageal reflux disease and Helicobacter pylori eradication[1].Epidemiologic studies strongly links obesity with the increasing incidence of distal esophageal and proximal gastric adenocarcinoma and death from this cancer.[5,6,7] In India though the prevalence of obesity has seen increasing trend [8] there is no evidence from the available population based cancer registry data to say that there is increasing trend in distal esophageal adenocarcinoma or proximal stomach carcinoma as in western population[9]. Consequently, the esophageal surgeon today is presented increasingly with the challenge of managing obese patients with adenocarcinoma of the esophagus or GE junction. The risk of operative mortality is up to 10%, with an approximate 50% risk of morbidity. Some evidence suggests that these risks may be further increased by neoadjuvant therapy, particularly combination chemotherapy and radiation therapy[10,11]. In our centre the patients receiving upfront chemotherapy and radiotherapy were few and excluded from this study. The management of localized esophageal disease has a major impact on quality of life of patient for several months.[12,13]

Studies of the implications of obesity are important, because they are helpful in preoperative risk assessment for patients undergoing esophageal surgery. Several factors i.e. association of obesity with existing comorbidities and medical conditions, insulin resistance, metabolic syndrome and chronic inflammation[14] , permit the hypothesis that obesity may increase the incidence of perioperative complications.

The principal risks after esophagectomy are respiratory complications. Obese patients are at a higher risk, because of reductions in functional residual capacity, expiratory reserve volume, and alveolar oxygen partial pressure, and an increase in the alveolar–arterial oxygen difference.[15,16] In our study we found that there was no significant difference in preoperative pulmonary function test results among both the groups (FEV1/FVC 69% vs 64%). Prolonged ventilator support may be required postoperatively in obese patients as compared to non obese patients as weaning may be delayed because of reduced chest wall compliance and increased airway resistance. Hence, obese patient are also vulnerable to significant hypoxia from major respiratory complications like atelectasis, pneumonia and ARDS.[15,16] In our study , though the respiratory complications were more in the overweight and obese group, but it failed to reach statistical significance.

Conclusion : Wound complications, sepsis, and mortality were similar in both normal BMI and overweight and obese groups. Respiratory complications like atelectasis , pneumonia and ARDS were more common among overweight and obese patients but did not reach statistical significance. Anastomotic leak was also slightly more common in overweight and obese patients but without statistical significance. With the increase in prevalence of obesity in India, more number of overweight and obese patients would be undergoing major radical surgeries for cancer treatment. Further studies are required in large patient groups to study the impact of obesity in these patients undergoing major surgeries.

REFERENCES:

1. Healy LA, Ryan AM, Gopinath B, Rowley S et al Impact of obesity on outcomes in the management of localized adenocarcinoma of the esophagus and esophagogastric junction; J Thorac Cardiovasc Surg 2007; 134: 1284-91.
2. World Health Organisation Consultation on Obesity. Preventing and managing the global epidemic: report of a WHO consultation on Obesity, Geneva, 3-5 June 1997, 1-276. Geneva, Switzerland: World Health Organization; 1998
3. Misra A, Chowbey P, Makkar BM, Vikram NK, Wasir JS et al Consensus Statement for Diagnosis of Obesity, Abdominal Obesity and the Metabolic Syndrome for Asian Indians and Recommendations for Physical Activity, Medical and Surgical Management ; Journal of the Association of Physicians of India; 2009; 57; 163-170.
4. Fanelli V, Vlachou A, Ghannadian S, Simonetti U, Slutsky AS et al Acute respiratory distress syndrome: new definition, current and future therapeutic options; J Thorac Dis. 2013 Jun; 5(3): 326–334.
5. Engel LS, Chow WH, Vaughan TL, Gammon MD, Risch HA, Stanford JL, et al. Population attributable risks of esophageal and gastric cancers. J Natl Cancer Inst. 2003;95:1404-13.
6. Lagergren J, Bergström R, Nyrén O. Association between body mass index and adenocarcinoma of the esophagus and gastric cardia. Ann Intern Med. 1999;130:883-90.
7. Calle EE, Rodriguez C, Walker-Thurmund K, Thun MJ. Overweight, obesity and mortality from cancer in a prospectively studied cohort of U.S. adults. N Engl J Med. 2003;348:1625-38.
8. Kalra S, Unnikrishnan A G. Obesity in India: The weight of the nation. J Med Nutr Nutraceut 2012;1:37-41.
9. Sharma A, Radhakrishnan V. Gastric cancer in India. Indian J Med Paediatr Oncol 2011;32:12-6
10. Fiorica F, DiBona D, Schepis F, Licata A, Shahied L, Venturi A, et al. Preoperative chemoradiotherapy for esophageal cancer: a systematic review and meta-analysis. Gut. 2004;53:925-30.
11. Reynolds JV, Ravi N, Hollywood D, Kennedy MJ, Rowley S, Ryan A, et al. Neoadjuvant chemoradiation may increase the risk of respiratory complications and sepsis after transthoracic esophagectomy J Thorac Cardiovasc Surg. 2006;132:549-55. 9. Blazeby JM, Sandford E, Falk SJ, Alderson D, Donovan JL. Health related quality of life during neoadjuvant therapy and surgery for localised esophageal cancer. Cancer. 2005;103:1791-9.
12. Blazeby, J. M., Sanford, E., Falk, S. J., Alderson, D. and Donovan, J. L. (2005), Health-related quality of life during neoadjuvant treatment and surgery for localized esophageal carcinoma. Cancer, 103: 1791–1799. doi:10.1002/cncr.20980
13. Reynolds, J. V., McLaughlin, R., Moore, J., Rowley, S., Ravi, N. and Byrne, P. J. (2006), Prospective evaluation of quality of life in patients with localized oesophageal cancer treated by multimodality therapy or surgery alone. Br J Surg, 93: 1084–1090. doi:10.1002/bjs.5373
14. Balkwill F, Mantovani A. Inflammation and cancer: back to Virchow? Lancet. 2001;357:539-45.
15. Adams JP, Murphy PG. Obesity in anaesthesia and intensive care. Br J Anaesth. 2000;85:91-108.
16. Flanchbaum L, Choban PS. Surgical implications of obesity. Ann Rev Med. 1998;49:215-34.