ORIGINAL ARTICLE

MODIFIED D2 GASTRECTOMY - A FEASIBILITY STUDY IN INDIAN SCENARIO

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ABSTRACT: Gastric Cancer is one of the most common causes of Cancer related death worldwide. Surgical resection with lymph node dissection is the only potentially curative therapy for gastric cancer. However, the appropriate extent of lymph node dissection accompanied by gastrectomy for cancer remains controversial. Surgeons of Japan and Korea consider D2 lymph node dissection a standard procedure. Acceptance of the same procedure in the west is not complete based on initial studies showing higher morbidity with D2 in comparison to D1 dissection without a favorable increase in survivals. However, more recent studies from the western hemisphere have shown better outcomes after D2 lymphadenectomies on western patients with a lower morbidity and mortality. When extensive D2 lymph node dissection is performed safely, there may be some benefit to D2 dissection. In this paper, we present a study of feasibility of D2 resection for gastric cancer in Indian patients at our hospital.
KEYWORDS: Cancer, GI Cancer, Gastrectomy, Radical Gastrectomy.

INTRODUCTION: Gastric cancer is one of the most common causes of death worldwide.[1] Radical surgical resection is the only treatment modality that offers maximum possibility of cure when gastric cancer is localized. For radical surgery, the optimum extent of lymph node dissection for gastric cancer has not been determined. There has been worldwide debate in the last two decades about the value of extended lymph node dissection. There are gross differences in the extent of surgery performed as a standard in different countries.

Pattern of disease failure after conventional resection of gastric cancer without extended lymph node dissection showed it to be local most often rather than distant one. Significant number of patients had recurrence in stomach bed or regional nodes.[2] This observation leads to underscoring the importance of loco regional extended nodal recurrence.

The Japanese Research Society for the study of gastric cancer (JRSGC) has standardized the lymph node dissection for gastric cancer. The JRSGC regards gastric resection without a formal clearance of D2 lymph nodes as an insufficient procedure, except for palliation.[3]

Japanese surgeons perform aggressively with extensive nodal dissection with outcomes not matched by the surgeons from the west.

D2 dissection is a standard practice in Japan since the 1960.[4] Initial experience in the western hemisphere as shown in prospective randomized trials performed in the Netherland and the UK[5, 6] has not shown any survival benefit for D2 over D1 lymph node dissection.

Despite these contradicting results from the east versus west, interest in extended lymph node dissections (D2 and greater) has not waned. Investigators have argued that if the complication rate after a D2 dissection could be decreased then there may be a benefit in

selected patients. Pancreatectomy and splenectomy even though routinely performed in Japan, these procedures are associated with significant morbidity and mortality. A surgical option that may decrease the morbidity and mortality is a modified D2 lymph adenectomy without pancreatectomy and splenectomy.

A phase II study conducted by Italian Gastric Cancer Study Group (Degiuli Met al.) reported in 2004, a survival benefit of pancreas preserving D2 gastrectomy, according to a technique described by maruyama (1995) et al[10] when performed in experienced cancer centres. Pancreatectomy was performed only in proximal gastric tumors with direct pancreas invasion. The overall post operative morbidity rate was 20.9% and mortality was 3.1% for D2 dissection without pancreatectomy. These rates are comparable to the rates of D1 dissections Dutch and U.K trail.[7]

There is an evolving consensus that splenectomy should be performed only in cases of intra operative evidence of direct extension to spleen or when the primary tumor is located in the proximal stomach along the greater curvature.

Studies at western centres have demonstrated that with increasing experience of surgeons in the performing D2 gastrectomy for selected western patients, the morbidity and mortality could be lowered.[9] Italian gastric cancer study group (IGCSG) performed a small RCT comparing D1 (76) and D2 (86 patients). Complication rate was 10.5% in D1 and 16.3% in D2 patients. Mortality was 1.3% in D1 and 0% in D2 confirming experience can make D2 gastrectomy as safe as D1 gastrectomy.[8]

In this background, this study was done to look for the feasibility of Modified D2 lymph node dissection in Indian patients, in our hospital setup. In the present study, analysis of morbidity and mortality of modified D2 dissection is done and compared with randomly selected D1 dissection as historical controls for gastric cancer was done.

AIMS AND OBJECTIVES: The present study was undertaken with following aims and objectives.

Primary aim: To study the morbidity and mortality of modified D2 lymphadenctomy and compare the results with equal number of randomly selected historical controls (D1 gastrectomy) done in out hospital as a routine for treatment for carcinoma of stomach.

MATERIALS AND METHODS: This study done at MNJ Institute of Oncology based on patients operated from August 2010 and December 2011. The patients with gastric carcinoma, included in the study are less than 70 years with good performance status (Eastern Co operative Oncology Group 0-1) and serum albumin >3.5gm/dl. The patients requiring emergency surgery and those who underwent previous gastric surgeries were excluded.

The preoperative assessment is done to 1) stage the tumor and 2) evaluate the fitness for surgery. The preoperative work up included thorough history and physical examination, ultrasound abdomen, CT Scan abdomen, chest X ray, OGD scopy, biopsy, liver function tests and potentially operable cases were selected for D2 lymph node dissection. Special attention is paid to asses pulmonary and cardiac status of these patients by doing pulmonary function tests, chest x

ray, ECG and Echo cardiogram (if necessary). Pet CT as an imaging modality was not considered for any patient.

The procedure planned is pancreas and spleen sparing, modified D2 gastrectomy. Splenectomy is done only in case of proximal gastric tumors with direct extension, enlarged lymph nodes at the splenic hilum or if the tumor is reaching the greater curvature of stomach. Pancreatectomy is planned in case of direct extension to pancreas only.

Fulfilling above criteria 21 patients underwent laparotomy. Of these 21 patients, gastrectomy with modified D2 lymph node dissection (pancreas and spleen sparing) was done in 13 patients. The remaining 8 patients were inoperable and underwent palliative procedures and are not included in the study. These 13 patients who underwent modified D2 gastrectomy (pancreas and spleen preservation) were compared with randomly selected 13 patients who underwent D1 gastrectomy routinely, during the same period for post operative morbidity, mortality, blood loss, operative time and metastatic lymph nodal spread (number of lymph nodes extracted, number of positive lymph nodes on the whole.)

RESULTS AND DISCUSSION: The results of this study comparing D1 and D2 lymph node dissection do confirm the experience with these dissections in Japan and many recent single institution western studies of low morbidity and mortality of spleen and pancreas preserving lymphadenectomy during gastrectomy.

Theoretically, removal of a wider range of lymph nodes by extended lymph node dissection increases the chances of cure. Undoubtedly, D2 dissection improves the quality of nodal staging. The rationale of performing D2 dissection is that it achieves a R0 resection due to the clearance of the metastatic N2 level lymph nodes that cannot be removed with a limited D1 dissection. About 50% of patients with metastatic lymph nodes undergoing a D2 dissection have positive N2 level lymph nodes. (Toukos 1998: Bunt 1995b: Roukos199a: Katai1998).

MRC UK trail and Dutch trail showed high morbidity and mortality with no survival benefit at 5years follow up, but at 11years follow-up results of the Dutch trail showed a survival advantage in a subset of D2 patients with positive N2 nodes and the results convey that if morbidity can be reduced, D2 dissection can be beneficial.

Mature long term follow up (median follow up of 15years) data from the Dutch randomized study of D1 and D2 dissection clearly demonstrates fewer loco regional recurrences and gastric cancer related deaths even though post operative morbidity and mortality were higher in D2 group.[11]

The increased morbidity/ mortality in the group of the pancreatico-splenectomy probably off set the survival benefit of D2 compared with D1 lymphadenectomy in the earlier analysis of the Dutch trail.

A Japanese study[10] showed no beneficial effect on survival if pancreatosplenectomy was combined with total gastrectomy, whereas morbidity was increased in these patients.

In the present study, with a mean age of 48 years for D2 and 51 for D1, we had 69% of patients to be of male sex. Most of the growths in this study were of pyloric stomach and signet ring cell adenocarcinoma was the dominating histology seen.

Complementing the location of the tumor, we had more distal gastrectomies than total gastrectomies. 23% of our patients in D2 group underwent total gastrectomies compared to 54% in MRC trail and 38% in Dutch trail.

15% of our D2 group patients had splenectomy while no Pancreatectomy was done in any of our patients.

Mean number of nodes retrieved was more in D2 group and the need for study of at least 15 nodes is met only in D2 group.

61% of retrieved nodes in D1 and 69% in D2 group were found disease positive and 33% of N2 station nodes in D2 were positive. All the N1 nodes of these groups of patients were found positive.

Average operative time (D1: 3.9 and D2: 4.8 hours) was comparable to the Alexandero Sierra (3.23 hours for D2). Average hospital stay for D1 patients was 14 days and D2 was 18 days and is comparable to Dutch trail of 25 days and MRC of 23 days for D2 procedure. Tata memorial hospital, India has put their average at 13days.

We classified our complications into surgical and non surgical and major complications were those that required re exploration. Delayed gastric emptying was high naso gastric output of more than 7days. Anastomotic leaks were identified by bilious drainage in the tube drains and signs of symptoms of intra abdominal sepsis.

Our morbidity rates were 38.5% in both D1 and D2 groups. We had one patient with duodenal stump leak and one patient each with intra abdominal abscess and hemorrhage. There was no mortality seen in D2 group.

In the Dutch trial the morbidity rate for D1 group was 25% and that for D2 dissection was 43%. In MRC trail the morbidity for D2 group was as high as 46%. Our morbidity rates of 38.5% (D2 dissections) were comparable to major studies done across the world (Table 1). A recent study from Tata Memorial Hospital, India showed minor and major morbidity rate of 4.4 and 4.4% respectively.[12]

	Number of Patients (D1/D2)	**Morbidity (%) (D1/D2)**	**Mortality (%) (D1/D2)**
Bonenkamp et al. (Dutch study)	380/331	25/43	4/10
Cushieri et al (MRC)	200/200	28/46	6.5/13
Dent et al. (Cape town study)	22/21	15/30	0/0
Degiuli M, et al. (Italian Gastric Cancer study Group)	0/191	0/20.9	0/3.1
Tata memorial Hospital (Shrikhande SV et al)	0/159	0/4.4	0/1.25
Present study	13/13	38.5/38.5	0/0

Table 1: Comparison of Morbidity and mortality in randomized trials and recent western trials of D1 vs D2 lymphadenectomy.

CONCLUSIONS: While the debate is still on about the extent of nodal clearance it is clear from this study that modified D2 dissection is safe and feasible. However expertise and standardization of the procedure is a must to have low morbidity and mortality and avoiding routine pancreatico splenectomy.

REFERENCES:

1. Cancer, Principles and practice of oncology De Vita et al. 8th edition.
2. Gunderson L, Sosin H. Adenocarcinoma of stomach: areas of failure in a pre operative series (Second or symptomatic look) clinicopathological correlation and implications for adjuvant therapy. Int J radiat oncol Biol phys 1982: 8: 1.
3. JRSGC Japanese Research Society for Gastric cancer. The general rules for the gastric cancer study in Surgery. Jpn J Surg 1973: 3: 61-71.
4. T. Kajitani, "The general rules for the gastric cancer study in surgery and pathology. Part I. Clinical classification," Japanese Journal of Surgery, vol. 11, no. 2, pp. 127–139, 1981.
5. J. Bonenkamp, I. Songun, J. Hermans et al., "Randomised comparison of morbidity after D1 and D2 dissection for gastric cancer in996 Dutch patients," The Lancet, vol. 345, no. 8952, pp. 745–748, 1995.
6. Cuschieri A, Fayers P, Fielding J, et al, for the Surgical Co operative group. Post operative morbidity and mortality after D1 and D2 resections for gastric cancer: preliminary results of the MRC randomised controlled surgical trial. Lancet 1996: 347: 995-99.
7. Degiuli M, Sasako M, Ponti A et al. Survival results of a multi centre phase II study to evaluate D2 gastrectomy for gastric cancer. Br. J Cancer 2004: 90: 1727-1732 Eur J Surg Oncol. 2004 Apr: 30(3): 303-8.
8. IGCSG. Morbidity and mortality after D1 and D2 gastrectomy for cancer: interim analysis of the Italian Gastric Cancer Study Group (IGCSG) randomised surgical trial. Eur J Surg Oncol. 2004 Apr; 30(3); 303-8.
9. Role of surgery in multidisciplinary treatment for solid cancers, Sasako M. Int J Clin Oncol. 2004 Oct; 9(5):346-51.
10. Maruyama K, Sasako M, Kinoshita T, Sano T, Kasai H, Okajima K. (1995), Pancreas preserving total gastrectomy for proximal gastric cancer. World J Surg. 1995 Jul-Aug;19(4): 532-6.
11. Songun, Ilfet, et al. "Surgical treatment of gastric cancer: 15-year follow-up results of the randomised nationwide Dutch D1D2 trial." The lancet oncology 11.5 (2010): 439-449.
12. Shrikhande SV .D2 dissection for gastric cancer in Tata Memorial Hospital: Indian data can now be incorporated in future international trials. Dig Surg- 01 Jan 2006: 23(3): 192-7.

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