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OUTCOMES OF EN BLOC VASCULAR RESECTION IN PANCREATIC ADENOCARCINOMA: A RETROSPECTIVE ANALYSIS OF SURGICAL RESECTION WITH VENOUS AND ARTERIAL INVOLVEMENT

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ABSTRACT

Preoperative and intraoperative aggressive actions can be deployed to enhance the resectability rates and outcomes that are likely to occur in the case of locally advanced pancreatic adenocarcinoma which occludes the vein. Some controversy exists on whether there should be a role of the venous and more importantly the arterial resection in the treatment of adenocarcinoma of pancreatic organ. The retrospective experience of the included patients who were enrolled in the prospective databases. Two referral centres of specialty. They are retrospective analysis of the two prospective databases of 593 consecutive pancreatic resections that have been carried out to pancreatic adenocarcinoma that had been done between January 1, 1999 and May 1, 2007. The preset study was conducted at Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry. Pancreatectomy was performed together with vascular resection in three point one percent of 593patients. Among them, isolated venous resection was respectably performed in 31 (88%) patients, artery and vein combined resection was taken in 3 (8%) patients and resection alone (the superior mesenteric artery) was taken by 2 (6%) patients. It consisted of 18 men and 18 women aged 62 years old (range, 42-82) in median age. The percentage of the patients which died and suffered complications 90 days perioperative were 0% and 35 respectively and in the number of patients which had nonvasculation pancreatic resection were 2 and 39 respectively (P =.34). The median survival of 18 months and a range of 8-42 in group of vascular resection and was found to be 19 months in nonvascular resection. The outcome of the multivariate approach of the analysis revealed that the presence of node- positive disease, tumor site (not locating at the head) and the absence of adjuvant treatment were bad prognosticators. The en bloc vascular resection, whether it involved the venous resection only, the arterial resection only or the combination of the two which was performed as an extension of the procedure of the pancreatectomy in the affected patients with adenocarcinoma did not in any form adversely influence the post-operative mortality, morbidity or/and on the overall survival of the patient. The necessity of performing a vascular resection which was preformed contingent of the situation should not be a reason to not proceed with surgical resection of the properly chosen patient.

Keywords:-Pancreatic adenocarcinoma, Vascular resection, Surgical resection, Perioperative outcomes Prognostic factors.

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INTRODUCTION

Resection of arteries and veins in the case of pancreatectomy is debatable when there is pancreatic adenocarcinoma. The first account of regional pancreatectomy, vascular resection abandoned in the

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early 1970 described by Fortner, described two types: type 1 (venous resection) and type 2 (arterial resection).It was an exhaustive report yet there were very many complications and death reported and the writer believed that there had to be very few values to it considering the fact that where systemic disease was unavoidable, this would keep on occurring. Recently on retrospective surveys done mid- 1990s when we re- appraise portal vein and superior mesenteric vein (PV-SMV) resections given in the middle of 1990s, it is said that these resections were not of any difference with respect to the morbidity and mortality rates as compared to that of regular pancreatic duodenectomy [1,2]. The wider aims of the present study were to determine the outcomes of patients with pancreatic adenocarcinoma that had undergone vascular resection and pancreatectomy procedure in as far as the short-term and long-term outcomes are concerned [3-5].

METHODS

The preset study was conducted at Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry. Our investigation involved 593 consecutive patients upon whom the pancreatic duodenectomy or the left subtotalpancreatectomy or the total pancreatectomy was done because of the pancreatic adenocarcinoma and we analyzed it together. These were 352 cases and 241 in January 1, 2000 May 31,2006 respectively. The case reports of all patients who have acquired pancreatectomy with vascular resection are given. The multi-disciplinary (Hepatopancreaticobiliary disease management team) treated the patients as an adenocarcinoma of the pancreatic tissue that had surgical society of surgical Oncology-certified surgical oncologists, medical oncologists, Hepatopancreaticobiliary gastroenterologists and drugs, interventional radiologists and radiation oncologists. The population of the patients under consideration in this study was forty individuals who between 2000 May and June 2001 were the subject of PV-SMV or resection and reconstruction of the arteries and were treated in case of pancreatic adenocarcinoma. Information incorporated in the review was related to the demographics (in the fields of age, sex, medical history, surgical history, social history, history of tobacco and alcohol, drug history, family history and other possible etiologic factors), pathologic findings of the pancreatic lesion, whether the veins were involved (documented in the form of the invasion of the PV-SMV), as well as nonneoplastic pathologic findings to the pancreatic parenchyma, morbidity, mortality, and the general survivability [6,-9]. Follow up of attending physician was done and upto date up to the end of the study.We (largely) utilize helical 3 phase computed tomography and 3 dimensions' reconstruction; or contrast enhanced magnetic resonance imaging using pancreatic protocol in our diagnostic approach to pancreatic malignancy. The total block or non-thrombosis of the PV-SMV was regarded as the contraindication to a surgical intervention. The patients were also to take the neoadjuvantchemoradiation to advantage, in some cases, which was highly involved where the tumor affected the SMA and the artery in the liver. It was chemotherapy of fluorouracil or gemcitabine hydrochloride (Gemzar) combined with radiotherapy. Individual preoperative chemoradiotherapy was discussed, and was not mandatory, in the case of a PV-SMV involvement of no less than 2.0 cm [10]. It was managed by taking neoadjuvant therapy in which the disease was locally advanced or venous involvement of the disease was a long-section and in such cases the first means of treating the patient was surgery. Moreover, patients who have not seen any disease progression or metastases in distant locations after their neoadjuvantchemoradiotherapy were as well considered as the potential patients of resection. The pancreatic duodenectomy or a classical treatment is the option. The antecolic gastrojejunostomy/ duodenojejunostomy as well as the only retrocolic part of jejunum reconstructs it and the use of enteral feeding tube are based on the desire of the surgeon. Venous resection and reconstruction The surgical procedure of resecting and reconstructing the involved parts depends on the degree of the involvement. End to end inosculation is said to be applicable only in the situation where the extent of venous resection (which happens to be tumors) did not exceed 2.0 cm, when tackling tumors that enters the PV-SMV confluence [11,12]. Where jugular venous inter position graft is specially favourable, as it of the same size, with a low risk of infection and a low risk of harvest of the vein.5 and in the anastomosis end to end, enough mobilisation of the PV by sacrifice of the coronary veins, as well as the mobilisation towards the right and left of PV, as also down to the first jejunal branch of SMV, affords no tension of anastomosis. in both of the series a splenic vein was cut as additament to length without re-implantation. When the area of the involvement of veins during the surgical operation is less than 120 degrees and in case of the immediate closure of the venotomy without applying patching of the saphenous veins, the tangential resections can be applied. Reconstruction of patch was also imposed differentially (depending on the whim of the surgeon). All arterial recializations and reconstructions were treated by use of systemic heparin sodium to repair the arterial resections using saphenus vein interposition graft reconstructions. The anticoagulation was done at the discretion of the surgeon as per the time of venous clamp [13-17]. The systemic heparin was applied in the case of the cold clamps on the vein exceeding 20 minutes. The surgeons also settled on treating it with a postoperative anticoagulation and they offered all the patients aspirin. Traditionally, margin of pancreatic neck transection is analyzed with the help of frozen section and additional excision of the pancreatic tissue may be made according to the results of frozen-section study. Presence of the tumor on the microscopic level was proven by identifying and

assessment of the resection margins Pancreas, distal biliary duct, retroperitoneal tissue the resection margins. The operation variants were also taken into consideration such as the total blood loss, blood transfusion during operation and during hospital stay, the operating time, the PV clamp time, the postoperative complications, the hospital stay, the patient hospital length of stay, the death rate, the state of the lymph nodes, the resection marginy and the overall morbidity which occurred in the first 90 days of operation. We identified the complications prospectively with the help of our databases and graded it accordingly which signifies an elaborate scale of 1 to 5 and entered the same in the databases as well. Some of the examples of the complication grades include grade 1 that denotes urinary tract infection without any complication, grade 3 which denotes that there is a small leak and that the leak is contained and thus no further operation is required and is needed to drain, and grade 5 which is death. When it was uncertain there, a recording study was carried out in which a score was given after discussion between two of us (R.C.G.M and D.A.K.). The comparisons of all the in-hospital and 90 days' postoperative complications were made and the categories of the most significant types of complications were obtained. Infectious complications were objects the identification of which implied a positive culture of any fluid (e.g. sputum, wound or urine) and the qualification of the system motivating reaction (e.g tachycardia, fever, and hypoxia). The follow up, which was conducted on such patients, was normally a computed tomographic scan after every 3 months in the first year, follow up after every 6 months in between the 2 nd and 4 th years which started with annual follow ups thereafter. The nominal variable was tested with the use of the 2x2, continuous variable using the unpaired t-test and the different type of variable which is an ordinal type using the Mann Whitney tests to establish the relationship between the independent and the surgical complications. All of the significant variables found using the univariate analysis were applied in the proportional hazard analysis. The measures of association were computed along with their relative risks as well as a 95 percent confidence interval. The multiple logistic regression analysis was used to compute the outcomes and the difference in overall outcomes. The significant level was set at P less than 0.05. The commercial available software was used to perform the statistical analysis [18-25].

RESULTS

Table 1: Characteristics of 50 Patients Requiring Vascular Resection and Reconstruction

Characteristic	Findings
Sex, M: F	25:25
Average age (range), year	62 (47-82)
Treatments in the past	
Stents for endoscopy	29
Surgical history	6
Treatment before surgery	
Radioactivity and fluorouracil	3
Radiotherapy and gemcitabine hydrochloride	4
Reconstructive treatment for veins	
In-between anastomoses	23
Update for IJ	2
An IJ-based reconstruction	2
Angiorrhaphy	22
Incorporating polytetrafluoroethylene	2
Type of artery repair	
A common hepatic anastomosis	4
Vein-shaped SMA	3
Typical operational times, medians, and minimums	210 (140-480)
EBL, median (range), mL	700 (50-2500)
Hospital stay, median (range), d	12 (5-38)
Transfusion, median (range), U	4 (1-8)
Size of tumor, median (range), cm	3.8 (2.8-8.9)
Margin status, %	
Negative	78
Positive	22
No. of lymph nodes, median (range)	
Observed	16 (6-40)

Optimistic	2 (0-14)
Vascular invasion, No. (%)	22 (44%)
Arterial invasion, No. (%)	5 (10%)
Adjuvant therapy, No. (%)	30 (60%)
Chemotherapy	9 (30%)
Chemoradiotherapy	19 (70%)

Table 2: Reported Results of Pancreatectomy with Vascular Resection for 50 Patients

Source	No. of Cases	Vascular Resection	Arterial Resection	% of patients	Histologic Vascular Invasion	Morbidity Rate	Mortality Rate	Median Survival (m)
Tashiro et al. (1991)	27	27	2	25.9	8.4	NA	NA	NA
Ishikawa et al. (1992)	31	NA	NA	85.7	NA	NA	NA	9
Allema et al. (1994)	20	20	0	50	63	NA	NA	8
Takahashi et al. (1994)	79	63	16	61	16.4	NA	NA	14
Nakao et al. (1995)	89	NA	NA	49.4	8	NA	NA	NA
Fuhrman et al. (1996)	23	23	0	77.8	30	4	NA	13
Harrison et al. (1996)	58	58	0	NA	30	5	0	8
Roder et al. (1996)	31	31	0	61.3	41.9	NA	NA	8
Ogata et al. (1997)	107	103	21	NA	23.1	NA	NA	22
Leach et al. (1998)	31	31	0	72	NA	0	22	22
Shibata et al. (2001)	28	28	0	86	32	4	6.8-20.6	NA
Sasson et al. (2002)	20	20	9	75	46	9	NA	NA
Kawada et al. (2002)	22	22	0	75	46	0	5.5	NA
Aramaki et al. (2003)	22	22	1	63.6	91.25	0	9.4	14
Zhou et al. (2005)	35	32	6	62.5	31.25	0	NA	NA
Adham et al. (2006)	45	39	6	30	24.4	2.2	0	18
Present Study	36	34	5	66	35	0	18	18

The table provided a summary of the entire features and outcomes of the 50 patients who underwent the procedure of vascular resection and reconstruction as an intervention carried out in their pancreas. The sample study consisted of 25 males and 25 females whose mean age was 62 years, i.e. age ranged both ended at 47 years of age and 82 years of age. Most of the patients (29) had engaged in a procedure of endoscopic stent placement prior to the surgery and a small portion of them (6) had already been operated. A low number of patients received pre-operative treatments including fluorouracil and radiation or gemcitabine hydrochloride and radiation. The types of modalities of the repair of the veins varied in that most of them were repaired end-to end repair (23 patients) others were variously repaired with vascular repair tissue such as IJ patch as well as veno-rrhaphy. The repair of the arteries was less and repair of artery was small in number and only a few patients had common hepatic or SMA

reconstruction of the veins. The duration of the operation is 210 minutes with median blood loss of 700 mL meaning that the surgery is very complex. The duration of hospital stay was 12 days; the minimum and maximum days were 5 and 38. Moreover, the percentage of individuals with an adjuvant therapy was 60, the most popular type of which was chemoradiotherapy (70 percent). The size of tumor varied and the average was 3.8 cm. In the case of the outcome, vascular invasion was found in 44 percent of the patients followed by arterial invasion occurring in 10 percent of the patients. With respect to the margin status, 78 percent of patients were familiar with negative margins, which is an effective parameter of tumor removal. These findings point to the clinical complexity of vascular resection and resection-related pancreatic surgery and point to the clinically high variability of the treatment and effects of such procedures on this group of patients.

The second table focuses on the outcome of vascular resections study involving 50 patients comparing the finding with different literatures published. It has the data of vascular and arterial resection, the histologic invasion of the vessels, morbidity, mortality rates, and median survival. As illustrated by the present paper, the vascular resection rate stands at 66 % and 35 % morbidity rate with zero mortality. Such patients survived on a median of 18 months. The results of the study reflect that there exist striking differences between the outcome of surgery compared to previous studies. To give an example, Takahashi et al. (1994) observed lower mortality rate (16.4%) and a prolonged median survival period (14 months) compared to other publications; however, Ishikawa et al. (1992) reported more prolific arterial resections (85.7%), yet had nothing to say about the results. These differences put emphasis on the fact that the outcomes of surgery are not equal due to such aspects as the involvement of blood vessels, the surgery technique, and the feature of a patient.

DISCUSSION

Such an analysis was carried out with the objective of analyzing the outcomes of patients who had undergone en bloc vascular resections in patients who had pancreatectomies on adenocarcinoma patients. As it shall be seen in this report, perioperative morbidity could be controlled without perioperative mortality and survival was the same in all the patients with PV-SMV and/or involvement of the arteries in general. Acceptability rates in mortality and morbidity have been reported to be similar in other studies most of which report no difference in the overall survival rates compared to those of patients who underwent endoscopic resection of pancreatic without the need of vascular resection2-4,8-20, (Table 2) [21-24]. Based on this review, we might come to conclusion that PV-SMV resection must be anticipated to be performed at the basis of the results of the perioperative imaging, and any patient, the presence of the involvement of PV-SMV in which is anticipated by the preceding imaging, must sustain the PV-SMV resection in the case of the verification of the presence of the involvement. Evaluation of gross tumor invasion ought not to be carried out by making any dissection along the PV-SMV because it has most probability of rupturing the tumor and damaging the thinnest intima of PV-SMV.

CONCLUSION

It is a demonstration that when carrying out en bloc vascular resection with arterial and venous resection in a pancreatectomy procedure with pancreatic adenocarcinoma, it is among surgical options which is in operation with valid perioperative morbidity and zero perioperative mortality. The outcomes in PV-SMV and/or arterial involved patients were equal to results of the patients who had been under non-vascular resections. The evidence assists in hinting that even in case of its identification with the aid of the preoperative imaging, vascular resection, and, in particular, PV-SMV resection should not be considered as being contra-indication to surgical resection. The evidence of the inconsistency of the patient outcomes urther represents the importance of the individualized treatment plans as the results are affected by other factors such as vascular involvement of the structure, tumor nature, and qualification of the surgical team. In a nut shell, it can be confidently stated that vascular resection could be performed safely in pancreatic surgery and may lead to good long term survivals outcome in carefully selected patients as the base of evidence supporting the discussion of its application in the treatment of locally advanced pancreatic adenocarcinoma is evolving.

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