

Role of Multivisceral Resection in G.I. cancer

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Indication

- Tumor involvement of adjacent organ
- Oncological principal intended to prevent the spread of cancer
- Surgical technique

Multivisceral Resection

- Stomach
- Gall bladder
- Biliary tract
- Pancreas
- Colorectal cancer
- Retroperitoneal tumors – Sarcoma
- Peritoneal carcinomatosis

Effectiveness of multivisceral resection in surgery for gastrointestinal cancers

- A retrospective analysis was conducted on 196 patients who underwent surgery involving multivisceral resection for adenocarcinoma of the abdominal digestive tract
- 101 patients were over 70 years old.
- Resection or removal of a neighboring organ was justified by
 - tumorous involvement of the organ,
 - oncological principles,
 - or the surgical technique required.
- [Ádám Balogh, József Karádi](#)
- [Surgery Today](#)
- May 1996, Volume 26, [Issue 5](#), pp 373-376

Table 1. Surgical procedures performed in the 196 patients (I)

Site of primary cancer	No. of patients	Operative mortality	Additionally resected organs	No. of patients	Positive microscopy
Stomach	84	5 (6%)	Omentum	84	26 (30%)
			Cardia-esophagus	26	21
			Lymph nodes	51	26
			Large bowel	16	14
			Spleen	15	2
			Pancreas	12	8
			Liver (wedge)	10	10
			Small bowel	8	8
			Gallbladder	4	1
			5-year survival	12 (15%)	0 (0%)

Table 2. Surgical procedures performed in the 196 patients (II)

Site of primary cancer	No. of patients	Operative mortality	Additionally resected organs	No. of patients	Positive microscopy
Water papilla*	4		Gallbladder	11	0
Duodenum*	1		Jejunum	11	2
Choledochus*	1		Spleen	11	0
Pancreas*	5		Stomach	5	2
			Large bowel	3	3
			Omentum	3	2
			Liver (wedge)	3	1
			5-year survival	2 (20%)	0 (0%)
Total	11	3 (27%)			

* Procedure: pancreatoduodenectomy

Total 196 patents

Overall mortality – 7.5 %

Group	A	B
No. of organs resected	Upto 2 organ	3 or more
n	134	62
mortality	5%	16%

5-year survival rate of patients with microscopic evidence of tumorous involvement of the resected neighbouring organs was significantly lower than that of those without any evidence of involvement

Multivisceral resection for gastric cancer: a systematic review.

BACKGROUND:

- The overall prognosis and survival of patients with advanced gastric cancer is generally poor. One of the most powerful predictors of outcomes in gastric cancer surgery is an R0 resection. However, the extent of the required surgical resection and the additional benefit of multivisceral resection (MVR) are controversial.

METHODS:

- Electronic literature searches were conducted using Medline, EMBASE, and the Cochrane Central Register of Controlled Trials from January 1, 1998 to December 31, 2009. All search titles and abstracts were independently rated for relevance by a minimum of two reviewers.
- [Gastric Cancer](#). 2012 Sep;15 Suppl 1:S100-7. Epub 2011 Jul 23.
- [Brar SS](#), [Seevaratnam R](#), [Cardoso R](#), [Yohanathan L](#), [Law C](#), [Helyer L](#), [Coburn NG](#).
- Division of Surgical Oncology, Odette Cancer Centre, Sunnybrook Health Sciences Centre, University of Toronto, Suite T2-60, 2075 Bayview Ave, Toronto, ON, M4N 3M5, Canada.

Primary tumor (T)

TX	Primary tumor cannot be assessed
T0	No evidence of primary tumor
Tis	Carcinoma in situ: intraepithelial tumor without invasion of the lamina propria
T1a	Tumor invades lamina propria or muscularis mucosa
T1b	Tumor invades submucosa
T2	Tumor invades muscularis propria
T3	Tumor penetrates subserosal connective tissue without invasion of visceral peritoneum or adjacent structures*. **.***
T4	Tumor invades serosa (visceral peritoneum) or adjacent structures**.***
T4a	Tumor invades serosa (visceral peritoneum)
T4b	Tumor invades adjacent structures

*A tumor may penetrate the muscularis propria with extension into the gastrocolic or gastrohepatic ligaments, or into the greater or lesser omentum, without perforation of the visceral peritoneum covering these structures. In this case, the tumor is classified T3. If there is perforation of the visceral peritoneum covering the gastric ligaments or the omentum, the tumor should be classified T4.

**The adjacent structures of the stomach include the spleen, transverse colon, liver, diaphragm, pancreas, abdominal wall, adrenal gland, kidney, small intestine, and retroperitoneum.

***Intramural extension to the duodenum or esophagus is classified by the depth of the greatest invasion in any of these sites, including the stomach.

Regional lymph nodes (N)

NX	Regional lymph nodes cannot be assessed
N0	No regional lymph nodes metastasis
N1	Metastasis in 1 to 2 regional lymph nodes
N2	Metastasis in 3 to 3 regional lymph nodes
N3	Metastasis in 7 or more regional lymph nodes
N3a	Metastasis in 7 to 15 regional lymph nodes
N3b	Metastasis in 16 or more regional lymph nodes

*A designation of pN0 should be used if all examined lymph nodes are negative, regardless of the total number removed and examined.

Distant Metastasis (M)

M0	No distant metastasis (no pathologic M0; use clinical M to complete stage group)
M1	Distant metastasis

RESULTS:

- Seventeen studies were included in this review.
- Among the 1343 patients who underwent MVR, overall complication rates ranged from 11.8 to 90.5%.
- Perioperative mortality was found to be 0-15%.
- Pathological T4 disease was confirmed in 28.8-89% of patients.
- R0 resection and extent of nodal involvement were important predictors of survival in patients undergoing MVR. Patient outcomes may also be affected by the number of organs resected.

CONCLUSIONS:

- Gastrectomy with MVR can be safely pursued in patients with locally advanced gastric cancer to achieve an R0 resection.
- MVR may not be beneficial in patients with extensive nodal disease.

Multivisceral resection for T4 or recurrent colorectal cancer.

BACKGROUND:

- Approximately 10% of patients with colorectal cancer have locally advanced disease with peritoneal involvement (T4a) or invasion of adjacent organs (T4b) at the time of diagnosis. Of patients who undergo resection with curative intent, between 7 and 33% develop isolated locoregional recurrences. R0 surgical excision is potentially curative.

METHODS:

- We reviewed the literature relating to multivisceral resection for T4 or recurrent colorectal cancer.
- [Larkin JO, O'Connell PR.](#)
- [Dig Dis.](#) 2012;30 Suppl 2:96-101. doi: 10.1159/000342037. Epub 2012 Nov 23.
- Surgical Professorial Unit, St. Vincent's University Hospital and UCD School of Medicine and Medical Sciences, Dublin, Ireland.

RESULTS:

- Comprehensive staging to identify the local and systemic extent of disease is essential to determine resectability and patient suitability for a curative approach.
- PET scans and pelvic MRI (rectal) staging and a coordinated multispecialty input to neoadjuvant treatment, multivisceral surgical resection, reconstruction and adjuvant chemotherapy are essential.
- Intraoperative radiotherapy and hyperthermic intraperitoneal chemotherapy may have a role in selected patients.
- R0 resection can achieve 5-year local control rates for primary locally advanced and recurrent colorectal cancer of up to 89 and 38%, respectively, and overall 5-year survival up to 66 and 25%, respectively.

CONCLUSION:

- An aggressive surgical strategy as part of a multimodal strategy in the treatment of locally advanced or recurrent colorectal cancer in the absence of incurable metastatic disease affords the best prospect for long-term survival in selected patients.

Treatment of locally recurrent rectal cancer

BACKGROUND:

- It has not been common practice to operate local recurrence after rectal cancer and the treatment has received little attention in the J Norw Medical Ass.

MATERIAL AND METHODS:

- This overview is based on literature retrieved from PubMed and own experience during 16 years.

[Tidsskr Nor Laegeforen.](#) 2007 Nov 29;127(23):3097-101.

[Wiig JN](#), [Dueland S](#), [Larsen S](#), [Giercksky KE](#).

RESULTS AND INTERPRETATIONS

- ✓ Type of local recurrence and the treatment related to it are classified and described.
- ✓ Most recurrences will benefit from preoperative irradiation. The difficulties caused by the confusion of postoperative fibrosis and recurrent cancer with regard to diagnosis, operability, the demand for multivisceral resection and the operative technique are discussed.
- ✓ The operations will often require cooperation between rectal surgeons, urologists, orthopaedists as well as plastic surgeons and gynaecologists. Our hospital has one of the largest published series, most other materials are small (< 70 patients).

- ✓ The results vary considerably regarding both survival and recurrences. This may be caused by differences in patient selection, oncological treatment and surgical aggressiveness.
- ✓ The surgical radicality is the most important prognostic factor. After a microscopic radical resection (R0 resection) the survival is similar to that for resection of Dukes C-grade primary colorectal cancer.
- ✓ The prognosis can probably be improved by improving the preoperative chemoradiation. This treatment should only be offered in a few centres in Norway because of the specific requirements.

Role of extended resection in the initial treatment of locally advanced colorectal carcinoma

- The focus of this review is the role of extended resection in the initial treatment of primary colorectal carcinoma.
- About 10% of patients with newly diagnosed colorectal cancer will have locally advanced disease without evident distant or discontinuous intraabdominal metastases.

[Surgery](#). 1993 Apr;113(4):365-72.

[Lopez MJ](#), [Monafo WW](#).

- En bloc resection of such tumors, including attached tissues or organs, provides a 5-year survival rate of about 40%, if the microscopic margins are tumor free.
- As many as 60% of these large tumors are node negative; in this circumstance the 5-year survival rate approaches 70%. These results are achievable when there is a meticulous preoperative and intraoperative search for metastases, a wide anatomic resection, including en bloc lymphadenectomy, is performed, and tumor manipulation is minimized.

- Blunt separation of structures adherent to the primary tumor should be avoided because adhesions will be neoplastic in about 50% of cases, and cancer recurrence is virtually certain when tumor is transected.
- The mortality from multivisceral resection, including total pelvic exenteration, should be 10% or less.

Comparison of multivisceral resection and standard operation for locally advanced colorectal cancer: analysis of prognostic factors for short-term and long-term outcome.

PURPOSE:

- The aim of the present study is to clarify the characteristics of multivisceral resection and to discuss strategies for improving the overall outcome of multivisceral resection for locally advanced colorectal cancer.

METHODS:

- The study included 323 patients who electively underwent curative surgery for pT3-pT4 colorectal carcinoma without distant metastasis. We evaluated the short-term and long-term outcome of multivisceral resection relative to that of the standard operation by means of multivariate analysis of the prognostic factors.

[Dis Colon Rectum](#). 2004 Dec;47(12):2055-63.

[Nakafusa Y](#), [Tanaka T](#), [Tanaka M](#), [Kitajima Y](#), [Sato S](#), [Miyazaki K](#).

RESULTS

- Of 323 patients, 53 (16.4 percent) received multivisceral resection because of adhesion to other organs.
- Multivisceral resection was significantly associated with tumor size, depth of invasion, operative blood loss, operation time, and blood transfusion (all: $P < 0.0001$).
- Overall morbidity rates were 49.1 percent after multivisceral resection vs. 17.8 percent after the standard operation ($P < 0.0001$), and postoperative mortality rate was 0 percent in both groups (not significant).
- The survival rate of patients after multivisceral resection was similar to that after the standard operation (5-year rate, 76.6 percent vs. 79.5 percent, $P = 0.9347$).

- Only multivisceral resection (odds ratio, 2.725; 95 percent confidence interval, 1.125-6.623; P = 0.0264) was an independent factor for overall postoperative complications.
- Lymph node metastasis (hazard ratio, 2.510; 95 percent confidence interval, 1.460-4.315; P = 0.0009) and blood transfusion (hazard ratio, 2.353; 95 percent confidence interval, 1.185-4.651; P = 0.0145) were independently associated with patient survival.

CONCLUSIONS:

- For locally advanced colorectal cancer, the long-term outcome after multivisceral resection is comparable to that after the standard operation.
- However, it should be recognized that multivisceral resection is associated with higher postoperative morbidity.
- In addition, a reduction in the incidence of blood transfusion may contribute to improving patient survival.

Multivisceral resection for colon carcinoma.

PURPOSE:

- To investigate the value of multivisceral resection in primary colon carcinomas and factors influencing its success.

METHODS:

- Prospectively collected data for 174 patients from the Erlangen Registry for Colorectal Carcinomas who underwent multivisceral resection for colon carcinoma from 1978 through 2002 were analyzed.
- Multivisceral resection was defined as the excision or resection of at least one further organ in addition to the carcinoma-affected colon.
- Postoperative complications, locoregional tumor recurrence, distant metastases, and cancer-related survival were evaluated after a five-year follow-up.

[Dis Colon Rectum](#). 2009 Aug;52(8):1381-6. doi: 10.1007/DCR.0b013e3181ab580b.

[Croner RS](#), [Merkel S](#), [Papadopoulos T](#), [Schellerer V](#), [Hohenberger W](#), [Goehl J](#).

RESULTS:

- Multivisceral resection most commonly involved parts of the small intestine (31.6%), urinary bladder (27.0%), and the abdominal wall (15.5%).
- R0 resection (no residual tumor) was achieved in 93.1%.
- Overall, postoperative complications occurred in 25.8%, and the postoperative mortality rate was 6.9%.

- For patients with R0 resection, the Kaplan-Meier estimate of five-year cancer-related survival was 80.7%; no patient with R1 or R2 resection survived for 5 years.
- The five-year rate of locoregional tumor recurrence was 6.5%, and the five-year rate of distant metastases was 24.2%.
- The presence of lymphatic metastases was a significant prognostic factor for locoregional tumor recurrence, distant metastases, and cancer-related survival.

CONCLUSION:

- The high percentage of R0 resections achieved through multivisceral resection justifies this procedure for locally advanced colon carcinomas and highlights the importance of experienced, well-trained surgeons to decrease the incidence of locoregional recurrence.

Results of multivisceral resection of primary colorectal cancer

BACKGROUND:

- The aim of this study is characterization of the patient population as well as evaluation of the morbidity and mortality associated with multivisceral resection

METHOD:

- Between 1/95 and 6/04, we analyzed all patients with progressive primary colorectal cancer, who underwent multivisceral surgery with en bloc resection of at least one other organ. The target parameters were tumor characteristics as well as postoperative morbidity and mortality.

[Zentralbl Chir.](#) 2006 Jun;131(3):217-22.

[Kruschewski M](#), [Pohlen U](#), [Hotz HG](#), [Ritz JP](#), [Kroesen AJ](#), [Buhr HJ](#).

RESULTS

- A total of 1 001 patients with colorectal cancer underwent surgery.
- 101 patients (10 %) required multivisceral resection.
- In 17 % the indication was exigent.
- About 70 % of the interventions involved the colon.
- Tumor perforation was seen in 17 % of patients with colon cancer and 16 % with rectal cancer.
- Resection of the inner genitals was most frequent in both colon and rectal cancer (26 and 84 %) followed by small bowel resection (21 %) and partial bladder resection (19 %).

- Other organs play a secondary role in rectal cancer while partial bladder resection (20 %) and abdominal wall resection (14 %) is observed more frequently in colon cancer.
- Resection of parenchymatous organs (kidney, suprarenal gland, spleen, pancreas, liver) and others like the stomach is quite rare in colon cancer.
- Actual tumor infiltration (T4 situation) was observed in 51 % of patients with colon cancer and in 64 % of those with rectal cancer.
- Local R0 resection (97 vs. 96 %) was successfully performed in nearly all colon and rectal cancer patients.
- The surgical major complication rate was 9 % in colon cancer and 19 % in rectal cancer. The mortality rate was 4 %.

CONCLUSION

- Multivisceral en-bloc resection enables local R0 resection in the majority of cases with primary colorectal cancer.
- Despite sometimes extensive surgery, this type of procedure is associated with an acceptable morbidity and mortality.
- Since long-term survival is comparable to that in the T category (T3 or T4), multivisceral en-bloc resection is not only justified but also absolutely required in interventions with curative intention.

Total pelvic exenteration for primary and recurrent malignancies

- Total pelvic exenteration (TPE) is an exenterative operation for these advanced tumors and involves en bloc resection of the rectum, bladder, and internal genital organs (prostate/seminal vesicles or uterus, ovaries and/or vagina).
- **METHODS:**
- Between 1994 and 2008, a TPE was performed in 69 patients with pelvic cancer; 48 with rectal cancer (32 primary and 16 recurrent), 14 with cervical cancer (1 primary and 13 recurrent), 5 with sarcoma (3 primary and 2 recurrent), 1 with primary vaginal, and 1 with recurrent endometrial carcinoma. Ten patients were treated with neoadjuvant chemotherapy and 66 patients with preoperative radiotherapy to induce down-staging. Eighteen patients received IORT because of an incomplete or marginal complete resection.

[World J Surg.](#) 2009 Jul;33(7):1502-8. doi: 10.1007/s00268-009-0066-7.

[Ferenschild FT](#), [Vermaas M](#), [Verhoef C](#), [Ansink AC](#), [Kirkels WJ](#), [Eggermont AM](#), [de Wilt JH](#).

RESULTS

- The median follow-up was 43 (range, 1-196) months.
- Median duration of surgery was 448 (range, 300-670) minutes, median blood loss was 6,300 (range, 750-21,000) ml, and hospitalization was 17 (range, 4-65) days.
- Overall major and minor complication rates were 34% and 57%, respectively.
- The in-hospital mortality rate was 1%.

- A complete resection was possible in 75% of all patients, a microscopically incomplete resection (R1) in 16%, and a macroscopically incomplete resection (R2) in 9%.
- Five-year local control for primary locally advanced rectal cancer, recurrent rectal cancer, and cervical cancer was 89%, 38%, and 64%, respectively.
- Overall survival after 5 years for primary locally advanced rectal cancer, recurrent rectal cancer, and cervical cancer was 66%, 8%, and 45%.

CONCLUSIONS

- Total pelvic exenteration is accompanied with considerable morbidity, but good local control and acceptable overall survival justifies the use of this extensive surgical technique in most patients, especially patients with primary locally advanced rectal cancer and recurrent cervical cancer.

Pancreatic surgery: beyond the traditional limits

- Complete surgical resection of the tumor is the mainstay of any curative therapeutic approach, however, up to 40 % of patients with potentially resectable pancreatic cancer are not offered surgery. This is despite 5-year survival rates of up to 40 % or even higher in selected patients depending on tumor stage and histology.
- Standard procedures for pancreatic tumors include the Kausch-Whipple- or pylorus-preserving Whipple procedure, and the left lateral pancreatic resection (often with splenectomy), and usually include regional lymphadenectomy.
- More radical or extended pancreatic operations are becoming increasingly utilised however and we examine the data available for their role. These operations include major venous and arterial resection, multivisceral resections and surgery for metastatic disease, or palliative pancreatic resection.

[Recent Results Cancer Res.](#) 2012;196:53-64. doi: 10.1007/978-3-642-31629-6_4.
[Müller SA](#), [Tarantino I](#), [Martin DJ](#), [Schmied BM](#).

- **Portal vein resection** for local infiltration with or without replacement graft is now well established and does not deleteriously affect perioperative morbidity or mortality.
- **Arterial resection**, however, though often technically feasible, has questionable oncologic impact, is not without risk and is usually reserved for isolated cases.
- The value of **extended lymphadenectomy** is frequently debated; the recent level I evidence demonstrates no advantage.

- **Multivisceral resections**, i.e. tumors, often in the tail of the pancreas, with invasion of the colon or stomach or other surrounding tissues, while associated with an increased morbidity and a longer hospital stay, do however show comparable mortality-and survival rates to those without such infiltration and therefore should be performed if technically feasible.
- Routine resection for **metastatic disease** however does not seem to show any advantage over palliative treatment but may be an option in selected patients with easily removable metastases.

Conclusion

- Pancreatic surgery beyond the traditional limits is established in tumors infiltration the venous system and may be a considered approach in selected patients with locally infiltrating pancreatic cancer or metastasis.

En bloc resection for locally advanced cancer of the pancreas: is it worthwhile?

- The benefit of radical surgical resection of contiguously involved structures for locally advanced pancreatic cancer is unclear. The aim of this study was to examine patient outcome after extended pancreatic resection for locally advanced tumors and to determine if any subset of extended resection affected outcome.
- We retrospectively reviewed the records of 116 patients with adenocarcinoma of the pancreas, who underwent extirpative pancreatic surgery between 1987 and 2000.

[J Gastrointest Surg.](#) 2002 Mar-Apr;6(2):147-57; discussion 157-8.

[Sasson AR](#), [Hoffman JP](#), [Ross EA](#), [Kagan SA](#), [Pingpank JF](#), [Eisenberg BL](#).

- Of the 116 patients, 37 (32%) required resection of surrounding structures (group I), and 79 patients (68%) underwent standard pancreatic resections (group II). In all cases, all macroscopic disease was excised.
- In group I a total of 46 contiguously involved structures were resected: vascular in 25 patients (54%), mesocolon in 16 (35%) (colic vessels in 3, colon in 13), adrenal in three (7%), liver in one (2%), stomach in one (2%) (for a tumor in the tail of the pancreas), and multiple structures in four.
- Excision of regional blood vessels included the superior mesenteric vein and/or portal vein in 16, hepatic artery in five, and celiac axis in four.
- No differences between groups I and II were detected for any of the following parameters: age, sex, history of previous operation, estimated blood loss, or hospital stay.

- For the entire cohort the morbidity and mortality were 38% and 1.7%, respectively, and these rates were similar in the two groups.
- Adjuvant therapy was administered to more than 90% of patients in both groups.
- However, patients in group I were more likely to have received neoadjuvant therapy (76% vs. 42%, $P = 0.001$).
- Total pancreatectomy and distal pancreatectomy were more often performed in group I ($P = 0.005$).
- Additionally, the median operative time was longer (8.5 hours compared to 6.9 hours ($P = 0.0004$)).
- Both groups had similar rates of microscopically positive margins and involved lymph nodes, as well as total number of lymph nodes removed.

- The median survival was 26 months for patients in group I and 16 months for patients in group II (P = 0.08).
- The median disease-free survival for groups I and II was 16 months and 14 months, respectively (P = 0.88).
- In comparing patients in group I, who underwent vascular resection vs. mesocolon (colon or middle colic vessels) resection, the median survival was 26 months and 19 months, respectively (P = 0.12).
- We were unable to detect a difference in outcome for patients with locally advanced cancers requiring extended pancreatic resections compared to patients with standard resections.
- En bloc resection of involved surrounding structures, to completely extirpate all macroscopic disease, may be of benefit in selected patients with locally advanced disease, particularly when combined with preoperative chemoradiation therapy.

Reappraisal of hepatopancreatoduodenectomy as a treatment modality for bile duct and gallbladder cancer.

- Hepatopancreatoduodenectomy has been performed to achieve radical resection in malignant biliary tumors. We reviewed clinical outcomes to evaluate the clinical feasibility of hepatopancreatoduodenectomy for the treatment of gallbladder and bile duct cancer.
- Twenty-three patients underwent hepatopancreatoduodenectomy from 1995 to 2007; 10 gallbladder cancer and 13 bile duct cancer. Median follow-up periods were 15.0 months.

[J Gastrointest Surg.](#) 2012 May;16(5):1012-8. doi: 10.1007/s11605-012-1826-5. Epub 2012 Jan 24.

[Lim CS](#), [Jang JY](#), [Lee SE](#), [Kang MJ](#), [Kim SW](#).

Results

- R0 resection was performed in 17 of 23 patients (73.9%).
- Morbidity and mortality rates were 91.3% and 13.0%, respectively.
- Five-year survival rates were 10.0% for gallbladder cancer and 32.3% for bile duct cancer.
- Survival more than 3 years was possible for most patients with stage IIA or less, whereas all gallbladder cancer patients with stage III and all bile duct cancer with stage IIB or more died within 2 years.
- Bile duct cancer patients with pN0 survived longer than those with pN1 ($p < 0.001$).

Conclusion

- To obtain negative proximal and distal ductal resection margins in the biliary tract cancer, R0 resection and long-term survival can be achieved by hepatopancreatoduodenectomy. However, its adoption in patients with lymph node metastasis or adjacent organ invasion cannot be recommended.

Indication of hepatopancreatoduodenectomy for biliary tract cancer.

- The indication for a hepatopancreatoduodenectomy (HPD) in patients with advanced biliary tract cancer is still controversial, because this aggressive surgery might be associated with high mortality and morbidity rates.
- In this study, we review our experience with HPD for advanced Eleven patients with biliary tract cancer underwent HPD at Wakayama Medical University Hospital between 1986 and 2004. Univariate analysis was used to assess independent variables of the mortality and morbidity associated with HPD.

[World J Surg.](#) 2006 Apr;30(4):567-73; discussion 574-5.

[Hirono S](#), [Tani M](#), [Kawai M](#), [Ina S](#), [Uchiyama K](#), [Yamaue H](#).

Results

- The rates of mortality and morbidity were 18% and 82%, respectively. Univariate analysis showed that the total serum bilirubin level before surgery and the hepatic parenchymal resection of more than two Healey's segments correlated significantly with an increased risk of severe complications ($P = 0.044, 0.0152$, respectively). The 1-, 2-, and 3-year survival rates were 44%, 33%, and 11%, respectively.

Conclusion

- Hepatopancreatoduodenectomy might offer a chance of long survival by yielding a tumor-free margin in selected patients who are able to tolerate such an aggressive operation, but the indication for this aggressive surgery should be carefully considered.

Complete and safe resection of challenging retroperitoneal tumors: anticipation of multi-organ and major vascular resection and use of adjunct procedures

- Retroperitoneal tumors are often massive and can involve adjacent organs and/or vital structures, making them difficult to resect. Completeness of resection is within the surgeon's control and critical for long-term survival, particularly for malignant disease. Few studies directly address strategies for complete and safe resection of challenging retroperitoneal tumors.
- Fifty-six patients representing 63 cases of primary or recurrent retroperitoneal tumor resection between 2004-2009 were identified and a retrospective chart review was performed. Rates of complete resection, use of adjunct procedures, and perioperative complications were recorded.
- *World Journal of Surgical Oncology* 2011, **9**:143

Result

- In 95% of cases, complete resection was achieved. Fifty-eight percent of these cases required en bloc multi-organ resection, and 8% required major vascular resection. Complete resection rates were higher for primary versus recurrent disease. Adjunct procedures (ureteral stents, femoral nerve monitoring, posterior laminotomy, etc.) were used in 54% of cases. Major postoperative complications occurred in 16% of cases, and one patient died (2% mortality).

Conclusion

- Complete resection of challenging retroperitoneal tumors is feasible and can be done safely with important pre- and intraoperative considerations in mind.