Simultaneous operations in thoraco-abdominal clinical oncology

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Abstract

Objective: To increase radical operability of cases with synchronous multiple primary malignant tumours (SMPMT) of the thorax and abdomen, and of cancer patients with concomitant severe heart disease simultaneous operations are implemented in the clinical practice.

Methods: Twenty-seven simultaneous operations for SMPMT (17) and for cancers of different sites and concomitant cardiac disease (10) were performed at the Surgical Department of Thoraco-Abdominal Oncology, N.N. Blokhin Memorial Cancer Research Centre. All SMPMT cases had lung cancer. The second tumours were gastric cancer (6), oesophageal cancer (7), laryngeal cancer (3) and opposite lung cancer (1). Coronary artery bypass grafting for ischaemic heart disease was made in nine cases simultaneously with lung resection (4), tracheal resection (1), resection of the stomach or gastrectomy (4). Mitral valve commissurotomy and left pneumonectomy for lung cancer was made in one case.

Results: Two patients died from therapeutic complications early postoperatively. Median survival after simultaneous operations for SMPMT was 26 months. One patient undergoing simultaneous operation for cardiac disease and lung cancer died from cancer progression at 1 year following surgery. The remaining patients were followed up for 2 years free from evidence of cancer or heart disease. Conclusion: Simultaneous operations increase resectability, radicality and functional operability and therefore promise improvement of follow-up results in the most serious category of cancer patients in question. © 2001 Elsevier Science B.V. All rights reserved.

Keywords: Simultaneous operations; Synchronous multiple primary malignant tumor; Coronary artery bypass grafting

1. Introduction

Simultaneous operations are surgical procedures performed synchronously on two or more sites for different unrelated diseases [22]. The main purpose of these operations is to free the patient from several diseases simultaneously and to achieve a long-lasting remission or cure.

The advance in surgical techniques, resuscitation and anaesthesiology support over the last years allowed simultaneous thoracic and abdominal operations to be made for synchronous cancers and for cancer and concomitant severe heart and vessel disease [2,18,19,21].

According to the literature synchronous operations for two or even more diseases were not rare events over the last two decades [1–22]. As coronary surgery was progressing, operations consisting of simultaneous myocardial revascularization together with manipulations on another site were attempted. The purpose of such operations is to improve coronary circulation (as an independent goal) and to reduce simultaneously the risk of extracardial interventions in patients with severe ischaemic heart disease.

In 1978 Danton et al. published the first report of a successful one-stage operation on the heart for ischaemic heart disease (IHD) and on a lung for adenocarcinoma. During 1980–1997 about 300 reports of simultaneous operations for heart disease and cancer were published by different authors (Refs. [1–17] and others). Lung cancer plus cardiac disease was the most common (79%) combination and, as should be emphasized, the authors were in favour of simultaneous versus staged procedures.

Over the last years simultaneous operations were performed not only with coronary artery bypass grafting (CABG), but also with prosthesis or reconstruction of cardiac valves, resection and one-stage prosthesis of thoracic or abdominal aorta, with minimal early postoperative morbidity in most cases. For example, Watanabe et al. [2] reported a successful concomitant surgery consisting of resection and prosthesis of aortic arch aneurysm and wide resection of the left lung for cancer, simultaneous prosthesis of thoracic and abdominal aorta and lung resection.

Therefore the purpose of this paper is to demonstrate up-to-date approaches to simultaneous operations in the thorax...
and abdomen for synchronous malignant tumours as well as for severe heart and vessel disease in cancer patients as attempted at the Surgical Department of Thoraco-Abdominal Oncology, N.N. Blokhin Memorial Cancer Research Centre, RAMS.

2. Materials and methods

Twenty seven patients undergoing surgery at the Surgical Department of Thoraco-Abdominal Oncology, N.N. Blokhin Memorial Cancer Research Centre, RAMS, during 1988–2000 were entered into this study. The patient age varied from 42 to 68 years. Three patients were female and 24 were male.

Group 1 was composed of 17 patients undergoing surgery for synchronous multiple primary malignant tumours (SMPMT). All of the cases had lung cancer in combination with cardio-oesophageal cancer (1), gastric cancer (5), oesophageal cancer (7), laryngeal cancer (3) or opposite lung cancer (1) (Fig. 1). Most cases had stage 1 or 2 cancer and were eligible for radical surgery (Table 1). Histologically the lung cancers were squamous cell carcinomas (13), adenocarcinomas (4) and clear-cell carcinoma (1). All of the cardio-oesophageal and gastric cancers were adenocarinomas; all of the oesophageal and laryngeal cancers were squamous cell carcinomas. Surgical interventions were performed simultaneously in the thorax and abdomen in most cases. Cases with cardio-oesophageal cancer, gastric cancer with oesophagus involvement, and oesophageal cancer underwent simultaneous plasty with the stomach or small intestine and intrapleural anastomosis. Table 2 lists types of surgical procedures.

Group 2 was composed of patients undergoing surgery for cancer and severe heart disease (IHD or a valve defect) (Table 3). By histology the lung cancers were squamous cell carcinomas (2) and adenocarcinomas (3). Most of the cases had stage 1 or 2 gastric and lung cancers and were eligible for radical surgery (Table 4). Histologically the tracheal cancer was adenocystic carcinoma. The tumour was located in mid-thoracic trachea and affected five tracheal rings. The operation was made through full longitudinal ster-

Table 1
Cancer advance (first group of patients) a

<table>
<thead>
<tr>
<th>Cancer type</th>
<th>Cancer stage (pTNM)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1,N,N,M0</td>
</tr>
<tr>
<td>Lung cancer</td>
<td>5 (I?)</td>
</tr>
<tr>
<td>Gastric cancer</td>
<td>1 (Ia)</td>
</tr>
<tr>
<td>COC</td>
<td>–</td>
</tr>
<tr>
<td>Oesophageal cancer</td>
<td>–</td>
</tr>
<tr>
<td>Laryngeal cancer</td>
<td>2 (I)</td>
</tr>
</tbody>
</table>

a COC, cardio-oesophageal cancer. Cancer stage in parentheses.

Fig. 1. Tumour types in SMPMT patients.
notomy, and consisted of CABG with circular resection of seven tracheal rings and intertracheal anastomosis to follow.

2.1. Patient functional particulars

The first stage of examination of patients at the cancer centre involved examination by the oncocardiologist to discover IHD, a history of angina pectoris, myocardial infarction, abnormality of cardiac rhythm, conductivity, etc. The routine tests were electrocardiography, echocardiography and bicycle exercise by indications.

The second stage was a more profound cardiological study by indications at the special cardiosurgical unit and consisted of stress-echocardiography, radioisotope heart muscle viability test, coronography and ventriculography. The above-mentioned investigations resulted in indications of CABG.

2.2. Indications of CABG

1. Angina pectoris of functional class 3 (double vessel coronary disease with the anterior descending artery involvement and all cases with triple vessel disease) or 4
2. Unstable angina
3. Painless myocardial ischaemia

2.3. Contraindications of CABG

1. Left ventricular ejection fraction less than 20%
2. Left ventricular end-diastolic pressure more than 200 mmHg

It should be emphasized that all the cases had multiple (at least triple) coronary vessel disease. Table 5 presents types of surgical procedures.

2.4. Operation particulars

- CABG was performed using a cardiopulmonary by-pass (CPB) and combined drug and cold blood cardioplegia in all cases.
- Two teams of surgeons (cardiac and thoracic) performed the operations.
- Autografts from lower extremity surface veins, greater saphenous vein and left internal mammary artery were used.
- In six cases oncological operation was performed at first stage and consisted of pulmonary resection (4), tracheal resection (1) due to the risk of bypass injury and mediastinal infection, and gastrectomy (1) due to tumour bleeding.

3. Results

Analysis of patient group 1 demonstrated the following. One patient died on postoperative day 5. This patient underwent proximal resection of the stomach and lower thoracic segment of oesophagus through a combined thoraco-abdominal incision and intrapleural oesophago-gastric anastomosis. Lewis operation, subtotal resection of the oesophagus and simultaneous plasty with stomach in the right pleural cavity. D2, lymph node dissection volume.

Follow-up results of surgical treatment in this patient group are far from satisfactory with median survival time being 26 months.

Table 2
Types of simultaneous operations for synchronous malignant tumours

<table>
<thead>
<tr>
<th>Operation</th>
<th>Lobectomy</th>
<th>Bilobectomy</th>
<th>Pneumonectomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Garlock operation</td>
<td>4</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Lewis operation</td>
<td>3</td>
<td>1</td>
<td>–</td>
</tr>
<tr>
<td>Transpleural gastrectomy D2</td>
<td>1</td>
<td>–</td>
<td>1</td>
</tr>
<tr>
<td>Transabdominal gastrectomy D2</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Distal subtotal resection of the stomach D2</td>
<td>2</td>
<td>–</td>
<td>1</td>
</tr>
<tr>
<td>Wedge resection of a lung</td>
<td>1</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Resection of the larynx</td>
<td>2</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Laryngectomy</td>
<td>1</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

Table 3
Simultaneous operations for cancer and heart disease

<table>
<thead>
<tr>
<th>Concomitant disease</th>
<th>Cancer</th>
<th>Bilobectomy</th>
<th>Pneumonectomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>IHD</td>
<td>4</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Mitral valve stenosis</td>
<td>1</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

Table 4
Cancer advance (second group of patients)

<table>
<thead>
<tr>
<th>Cancer type</th>
<th>Cancer stage (pTNM)</th>
<th>T1N0M0</th>
<th>T1N1M0</th>
<th>T2N0M0</th>
<th>T2N1M0</th>
<th>T2N2M0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lung cancer</td>
<td>3 (Ia)</td>
<td>1 (Ib)</td>
<td>1 (Iib)</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Gastric cancer</td>
<td>2 (Ia)</td>
<td>1 (Ib)</td>
<td>–</td>
<td>–</td>
<td>1 (IIIb)</td>
<td>–</td>
</tr>
</tbody>
</table>

* Stage of cancer in parentheses.
Table 5
Type of oncological operations with sever heart disease

<table>
<thead>
<tr>
<th>CABG</th>
<th>Commissurotomya</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atypical lung resection</td>
<td>2 –</td>
</tr>
<tr>
<td>Lobectomy</td>
<td>2 –</td>
</tr>
<tr>
<td>Pneumonectomy</td>
<td>– 1</td>
</tr>
<tr>
<td>Transabdominal gastrectomy (D2)</td>
<td>3 –</td>
</tr>
<tr>
<td>Distal subtotal resection of the stomach (D2)</td>
<td>1 –</td>
</tr>
<tr>
<td>Circulation resection of the trachea</td>
<td>1 –</td>
</tr>
</tbody>
</table>

a Mitral valve commissurotomy.

Analysis of patient group 2 demonstrated the following. One patient died on day 7 following surgery. This patient underwent left upper lobectomy and CABG. Within the first postoperative hours the patient developed incompetence of a bypass anastomosis and was given intensive red blood and donor blood transfusion. The death was caused by pulmonary and renal failure.

Another patient had severe postoperative course after CABG and distal subtotal resection of the stomach (D2) (gastric cancer stage T3N2M0). On day 1 postoperatively the patient developed thrombosis of femoral artery and underwent femoro-femoral cross bypass. On day 2 after first surgery the patient presented with mesenteric thrombosis and necrosis of a colonic segment. The patient underwent urgent thrombectomy from the upper mesenteric artery, right hemicolecotomy and resection of the sigmoid, and was dismissed in satisfactory general condition on day 35 after first surgery.

In this group one patient died from progression of neoplastic disease at 1 year after surgery consisting of CABG and distal subtotal resection of the stomach (D2) (gastric cancer T3N2M0). The remaining patients were followed-up for 2 years free from evidence of cancer or cardiac disease.

4. Discussion

In spite of the large experience of simultaneous operations there still are several disputable and unclear issues to be answered in future. However, simultaneous operations can be advocated basing on analysis of immediate results of surgery for SMPMT as performed at our clinic. Comparison of staged versus simultaneous operations with respect to follow-up results was also in favour of the latter. Palliation surgery rate was higher in the staged (4/13, 30.8%) against simultaneous (1/17, 7.7%) operation group. Intervals between the first and second stages ranged from 1 to 3 months. Most likely the delay in second operation might account for advance of synchronous cancers. Median survival time in the staged operation group was 17.5 months, or 14.5 months from second surgery, with none of the patients undergoing palliation surviving 12 months. Median survival after simultaneous operations was 26 months (Table 6).

As concerns simultaneous operations in cases with severe concomitant heart disease, it is not clear whether surgery for cancer or for cardiac disease should be performed first. This question was answered individually in each case with respect, among other aspects, to total heparinization during CPB that deteriorated conditions for cancer surgery. New approaches to CABG without CPB may help to solve this problem. For instance, Ochi and Yamada [3] have a large experience in off-pump CABG. They performed simultaneous operations for cancer in five patients and emphasized advantages of this methodology as regards both intraoperative blood loss and lower postoperative morbidity. This methodology is also advocated by Danton [5] and others.

5. Conclusion

Analysis of the experience of Thoraco-Abdominal Cancer Surgery Department, N.N. Blokhin Memorial Cancer Research Centre, RAMS, demonstrates that simultaneous procedures may become operations of choice in cases with synchronous cancers or concomitant cancer and severe heart disease with the improvement of surgical techniques, anaesthesiology and resuscitation support. This in turn will increase resectability, radicalism and functional operability in the most problematic category of cancer patients in question who otherwise are doomed to palliation and symptomatic treatment.

It should also be emphasized that simultaneous operation means completion of treatment and, if the prognosis is good, it is promising for early somatic and social rehabilitation.

References


