Brief Report

Surgical treatment of synchronous colorectal liver and lung metastases: the usefulness of thoracophrenolaparotomy for single stage resection

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ABSTRACT: When suitable, surgery still remains the therapeutic option to be preferred for patients carrier of colorectal liver and lung metastases. Since thoracophrenolaparotomy should be helpful during liver resection for some of these patients, simultaneous removal of right lung metastases can be proposed through this approach. Eleven consecutive patients (median age of 53 years) carrier of colorectal liver and lung metastases, underwent single session surgical resection of both liver and right lung lesions by means of J-shaped thoracophrenolaparotomy. The median number of liver metastases removed was 5 (range 2-30) and of lung metastases removed was 2 (range 1-3). Lung metastases were located in the upper lobe in 1 patient, in the middle lobe in 2, in the lower lobe in 6, and in the upper and lower lobe in 2. Mortality and major morbidity were nil. Two patients had a minor morbidity: one had wound infection and bile leakage treated conservatively and the other had transient fever. Mean overall survival was 24.4 months. An aggressive surgical approach should be undertaken for colorectal metastases: in case of multifocal liver disease with complex presentations, J-shaped thoracophrenolaparotomy could be considered as safe approach for combined liver and right lung metastasectomies.

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KEY WORDS: colorectal carcinoma; liver metastases; lung metastases; thoracophrenolaparotomy

Introduction

More than 50% of patients undergoing curative resection of a colorectal carcinoma will experience recurrent disease and liver and lung are the commonest sites of occurrence. The rationale for an aggressive surgical policy for both metastatic sites is well established and associated with improved prognosis,[1, 2] leading to the extension of the indications for surgery. Staged or simultaneous resections accomplished by thoracic and/or abdominal approach have been proposed.[3, 4] However, these approaches demand two or three (if bilateral lung metastases) operations, or otherwise a single operation by means of two separate incisions. Thoracophrenolaparotomy represents an established safe surgical approach in resective liver surgery[5, 6] and through this incision synchronous liver and right lung metastases can be treated simultaneously in a single session.

Methods

Eligibility criteria

Indications for liver and lung metastasectomies were as follows: (i) controlled primary disease; (ii) no evidence of extrahepatic lesions other than resectable lung metastases; (iii) disregarding number and distribution of colorectal liver metastases (CLM), technical resectability leaving a remnant liver volume of at least 40%; (iv) dis-

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regarding number and distribution of lung metastases, all of the detected nodules could be removed preserving enough functioning remnant lung based on the results of the preoperative cardiopulmonary functional tests; (v) patients eligible for a J-shaped thoracophrenolaparotomy because carrier of CLM located at hepatocaval confluence, or in the paracaval portion of segment 1, or in the upper portion of segments 4a, 7 and 8, or presenting strong-adhesion or infiltration of the diaphragm, irrespective of whether metastases in right lung are diagnosed throughout preoperative diagnostic workup.

Study population

Between September 2004 and April 2013, 298 patients underwent curative liver resection for CLM. Of these, 20 patients had simultaneous lung metastases. Nine patients received a thoracoscopic resection subsequent to liver surgery, since the latter was carried out without the need of a thoracoabdominal approach. Right lung metastases were resected synchronously with CLM in the remaining 11 patients by means of a thoracophrenolaparotomy. Characteristics of patients are listed in Table. The preoperative staging included for all patients colonoscopy, thoracoabdominal contrast-enhanced CT, contrast-enhanced MRI of the liver, and 18-FDG PET scan.

Location of lung metastases is shown in Table. Liver metastases were located in all segments, ranging between 3 and 85 mm in diameter. Four patients had multiple (more than 4) bilobar CLM; among them, one had a preoperative diagnosis of 25 liver metastases and surgical exploration revealed 5 more lesions. Liver resections included major liver resections, limited resections and enucleations of small superficial nodules. Wedge resections of the right lung were performed in all patients. Two patients had bilateral lung metastases and they received supplementary operation for the clearance of the left lung one month after the first operation.

Surgical procedures

The J-shaped abdominal incision conventionally

Table. Characteristics of patients and surgical procedures

Pt	Age (yr)/ Gender	Colorectal procedure	TNM	Previous chemotherapy	Previous procedures	No. of liver mts	Max size (mm)	Type of liver resection	No. of lung mts	Type of lung resection
1	48/F	LAR	pT3(G2)N2M1	5-FU+FA, FOLFOX	-	13	40	SERPS (ext S1-5-8)+ PR S3, S3-4b, S4a	3	ULWR (aS+vS), LLWR
2	50/F	RC	pT4(G2-3)N2M1	FOLFIRI+ bevacizumab	Liver (PR S5)	10	15	PR S1, S2-3, S4a, S5-6, S7, S8	1	LLWR
3	70/M	LC	pT2(G2)N0M0	Oxaliplatin+ Cetuximab	Right lung (LLWR), liver (RFA)	3	85	RH ext S4+PR S3-4b	2	ULWR (dS), LLWR
4	76/M	RC	pT2(G2)N0M0	Capecitabine	-	3	50	PR S5, S7+diaphragm resection	2	LLWR (double)
5	63/F	LC	pT3(G2)N2M1	FOLFOX	-	4	15	PR S6-7-8, S5, S2	2	LLWR (double)
6	49/M	RC	pT3(G2)N1M1	FOLFOX+ bevacizumab	Liver (RH)	3	80	PR S4-1pp, S3+ diaphragm resection	1	LLWR
7	48/F	Hartmann	pT4(G1)N1M1	FOLFOX+ bevacizumab, FOLFIRI	Liver (multiple PR)	5	23	PR S2, S3, S3-4b, S6	1	MLWR
8	63/M	LAR	pT3N2M0	FOLFOX, FOLFIRI+ bevacizumab	Liver (multiple PR)	2	85	RH ext S1 (whole)	1	LLWR
9	53/F	LC	pT3(G2)N1M1	FOLFOX+ bevacizumab, XELIRI	Liver (DEBIRI)	8	47	PR S7-8-4a, S5-4b, S3, S5	3	LLWR (double)
10	76/F	LC	pT3N0M1	FOLFIRI+ Cetuximab	-	5	15	PR S6-7-5-8	1	ULWR (vS)
11	42/M	LC	pT3(G2)N0M1	FOLFIRI+ Cetuximab	-	30	40	PR S1, S4a-5-8, S5-6-7, S2, S3, S4b, S2, S5	2	MLWR (double)

F: female; M: male; LAR: low anterior resection; RC: right colectomy; LC: left colectomy; 5-FU: 5-fluorouracil; FA: folinic acid; PR: partial resection; S: segment; LLWR: lower lobe wedge resection; RFA: radiofrequency ablation; RH: right hepatectomy; mts: metastases; SERPS: systematic extended right posterior sectionectomy; ext: extended; pp: paracaval portion; ULWR: upper lobe wedge resection; MLWR: middle lobe wedge resection; aS: apical segment; vS: ventral segment, dS: dorsal segment.