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Surgery for Lung Metastases from Colorectal Cancer

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Purpose: The liver and lung are the most common sites of metastases after curative resection of colorectal carcinoma, and only 10 months of median survival is achieved once metastases has occurred in the lung. About 10% patients have a solitary pulmonary metastasis and resection leads to a 5 year survival rate of 21-43%. We have tried to define ideal candidates for pulmonary resection in a patient with pulmonary metastases from colorectal carcinoma.

Methods: Between March 1990 to Feb. 2001, 25 patients underwent pulmonary resection for metastatic colorectal carcinoma. 15 patients were male, and 10 were female with mean age of 60.0 (range, 36-73) years. The primary sites were colon in 7 patients and rectum in 18 patients.

Results: The mean disease free interval was 30.04 ± (range, 1-84) months and 19 patients had single metastasis and 6 patients had multiple metastatic lesions. One patient had unilateral lesion. Wedge resection was done in 10 patients, lobectomy in 7, pneumonectomy in 2, wedge resection with bilobectomy in 2, segmentectomy and wedge resection in 1, and segmentectomy and lobectomy in 1 patient. Six patients recurred mean 13.7 months after the first operation (range, 1-33 months) and underwent wedge resection in 4 and one case each lobectomy and segmentectomy. Seven patients died during follow up with 3 year survival rate of 70.8% and 5 year survival rate of 43.4%.

Conclusions: The disease free interval, number of metastases, type and location of pulmonary resection, carcinoembryonic antigen had no correlation with survival rate. We conclude that surgical resection of colorectal lung metastases is safe and effective, and every

should be evaluated as a surgical candidate. *J Korean Soc Coloproctol* 2002;18:37-41

Key Words: Colorectal carcinoma, Pulmonary metastasis, Surgical resection, Prognostic factor, carcinoembryonic antigen

Blalock¹ 1944
5 9% 45%
2-5
1/3 5 가 6 1/4 10 가
10 90% 가
7
가 가 6-9 가 가
1990 3 2001 2 가
25

: , 134

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가

가

가
 , 가 가 가
 , carcinoembryonic antigen (CEA) 가 5 가 , 7
 (Table 1).
 가 30.04±
 19.79 (, 1 84) 가 19 ,
 가 6 가 21 ,
 가 4 (Table 2).
 10 (3
), 2 , 7 ,
 2 ,
 2 ,
 가 1 ,
 가 1 (Table 3).
 Kaplan meier¹⁰
 log-rank test Cox¹¹
 proportional hazards model P-value
 가 0.05

15 , 10 60.0±
 8.0 (, 36 73) 7 , 18
 3
 8 14

Table 1. Patient profiles

Age (years)	60.0±8.0 (36 73)
Sex	
Male	15
Female	10
Primary site	
Colon	7
Rectum	18
Regarding abdominal surgery	
Preop. radiotherapy	3
Postop. chemotherapy	14
Postop. radiotherapy	8
No treatment	9
Regarding lung surgery	
Postop. chemotherapy	13
Postop. radiotherapy	0
No treatment	12
Combined metastasis	
Brain	2
Liver	5
Disease free interval (months)	30.04±19.79 (1 84)

Table 2. The location of pulmonary metastases

Solitary (19)	Right (12)	RUL (4)
		RLL (8)
	Left (7)	LUL (2)
		LLL (5)
	Multiple (6)	Unilateral (2)
LUL+LLL		
Bilateral (4)		RLL+LLL
		RLL+LUL
		RUL+RML+LLL
		RML+LUL

() number of cases. RUL = right upper lobe; RML = right middle lobe; RLL = right lower lobe; LUL = left upper lobe; LLL = left lower lobe.

Table 3. Name of first and second pulmonary resection

First operation	25
Wedge resection (bilateral)	10 (3)
Segmentectomy	2
Lobectomy	7
Pneumonectomy	2
Bilobectomy+wedge resection	2
Segmentectomy+wedge resection	1
Lobectomy+segmentectomy	1
Second operation	6
Wedge resection	4
Segmentectomy	1
Lobectomy	1

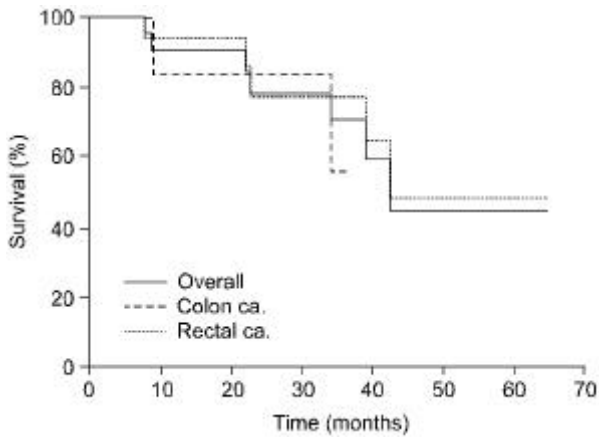


Fig. 1. Survival curve in patients with pulmonary metastases from colorectal carcinoma.

CEA 24 9.7 (, 0.3 46) ng/mL 가 6 (3) 13.7 (, 1 33) .4 1 (Table 3). 6.5 64.8 (26.9) 7 3 70.8%, 5 43.4% (Fig. 1). , 1 / , CEA (Table 4). 40% 10 5 가 5% 가 5-fluorouracil leuco- vorin methotrexate irino- tecan 10 15 10% 5 2,6,9

Table 4. Possible risk factors affecting survival

	Mean survival (months)	P-value
Gender		
Male	45.8 ± 5.7	0.5223
Female	45.6 ± 8.5	
Primary site		
Colon	31.3 ± 4.1	0.4677
Rectum	47.4 ± 5.8	
Postoperative (abdominal) chemotherapy		
Yes	44.8 ± 9.0	0.6760
No	46.5 ± 7.1	
Postoperative (abdominal) radiation therapy		
Yes	39.2 ± 8.3	0.7787
No	46.8 ± 7.2	
Preoperative carcinoembryonic antigen (CEA)		
≤ 5	44.0 ± 5.4	0.9396
> 5	49.0 ± 9.5	
Disease free interval (months)		
≤ 12	42.7	0.9312
12 - 24	46.8 ± 5.7	
24 - 36	45.5 ± 6.6	
> 36	53.8 ± 6.0	
0.2871		
Name of operation		
Wedge resection	42.9 ± 7.5	1.6592
Segmentectomy	45.6 ± 5.1	
Lobectomy	41.1 ± 6.7	0.7292
Pneumonectomy	All survive	N/A
Solitary versus multiple lesion		
Solitary	45.7 ± 6.5	0.9275
Multiple	44.7 ± 7.9	
Unilateral versus bilateral lesion		
Unilateral	48.7 ± 5.8	0.2897
Bilateral	33.7 ± 6.3	
Postoperative (pulmonary) chemotherapy		
Yes	43.4 ± 7.2	0.2848
No	46.7 ± 4.2	
Postoperative (pulmonary) recurrence		
Yes	51.6 ± 8.3	0.4061
No	42.7 ± 6.0	
Brain and liver metastases		
Yes	33.3 ± 3.9	0.5390
No	47.2 ± 5.9	

가 20% 가 2

CEA 가 5

2,12 가 7

가 Murata²⁰ 가

3,7,9,12 30

CEA 가 30 (, 7

5 16% 108) 48.5 (, 11 149)

47% (P < 0.01) 가 가 1-

2,3 CEA 3-, 5- 86.7%, 49.3%, 43.8%

CEA 가 가

가 가 20-22

가 2 가 Goldberg²³

2,14-17 548 109

3 5 (20%) 5

가 23% Zanella²⁴

5 62%, 5 45%

23.6 ,

15.3 ,

), , (,

2,3,15,17 가

16 가 가 가

가 15 가 가

2,18 가 가 가

가 가 가

2 가

가 Putnam¹⁹ 가

, 5 , 가 가

3 , CEA

가 가

REFERENCES

1. Blalock A. Recent advances in surgery. N Engl J Med

²⁰ McAfee²가 20

- 1944;231:261-7.
2. McAfee MK, Allen MS, Trastek VF, Ilstrup DM, Deschamps C, Pairolero PC. Colorectal lung metastases: Results of surgical excision. *Ann Thorac Surg* 1992;53:780-6.
 3. Girard P, Ducreux M, Baldeyrou P, Rougier P, Le Chevalier T, Bougaran J, et al. Surgery for lung metastases from colorectal cancer: Analysis of prognostic factors. *J Clin Oncol* 1996;14:2047-53.
 4. Ohata M. Surgical treatment for metastatic lung tumors with special references to colorectal lung metastases. *Hum Cell* 1993;6:88-93.
 5. Wilking N, Petrelli NJ, Herrera L, Regal AM, Mittelman A. Surgical resection of pulmonary metastases from colorectal adenocarcinoma. *Dis Colon Rectum* 1985;28:562-4.
 6. Rusch VW. Pulmonary metastasectomy. Current indications. *Chest* 1995;107:322S-31S.
 7. Girard P, Baldeyrou P, Le Chevalier T, Lemoine G, Tremblay C, Spielmann M, et al. Surgical resection of pulmonary metastases. Up to what number? *Am J Respir Crit Care Med* 1994;149:469-76.
 8. Masters GA, Golomb HM. Management of pulmonary metastases. *Lancet* 1995;386:68.
 9. Matthay RA, Arroliga AC. Resection of pulmonary metastases. *Am Rev Respir Dis* 1993;148:1691-6.
 10. Kaplan EL, Meier P. Nonparametric estimation from incomplete observations. *J Am Stat Assoc* 1958;53:457-81.
 11. Cox DR. Regression models and life-tables. *J R Stat Soc (B)* 1972;34:187-220.
 12. Zanella A, Marchet A, Mainente P, Nitti D, Lise M. Resection of pulmonary metastases from colorectal carcinoma. *Eur J Surg Oncol* 1997;23:424-7.
 13. Yoon SS, Tanabe KK. Multidisciplinary management of metastatic colorectal cancer. *Surg Oncol* 1998;7:197-207.
 14. Kobayashi K, Kawamura M, Ishihara T. Surgical treatment for both pulmonary and hepatic metastases from colorectal cancer. *J Thorac Cardiovasc Surg* 1999;118(6):1090-6.
 15. Goya T, Miyazawa N, Kondo H, Tsuchiya R, Naruke T, Suemasu K. Surgical resection of pulmonary metastases from colorectal cancer. 10 year follow-up. *Cancer* 1989;64:1418-21.
 16. Van Halteren HK, Van Geel AN, Hart AA, Zoetmulder FA. Pulmonary resection for metastases of colorectal origin. *Chest* 1995;107:1526-31.
 17. Yano T, Hara N, Ichinose Y, Yokoyama H, Miura T, Ohta M. Results of pulmonary resection of colorectal cancer and its application. *J Thorac Cardiovasc Surg* 1993;106:875-9.
 18. Mori M, Tomoda H, Ishida T, Kido A, Shimono R, Matsushima T, et al. Surgical resection of pulmonary metastases from colorectal adenocarcinoma. *Arch Surg* 1991;126:1297-302.
 19. Putnam JB, Suell DM, Natarajan G, Roth JA. Extended resection of pulmonary metastases: Is the risk justified? *Ann Thorac Surg* 1993;55:1440-6.
 20. Murata S, Moriya Y, Akasu T, Fujita S, Sugihara K. Resection of both hepatic and pulmonary metastases in patients with colorectal carcinoma. *Cancer* 1998;83(6):1086-93.
 21. Regnard JF, Grunenwald D, Spaggiari L, Girard P, Elias D, Ducreux M, et al. Surgical treatment of hepatic and pulmonary metastases from colorectal cancers. *Ann Thorac Surg* 1998;66(1):214-8; discussion 218-9.
 22. Ambiru S, Miyazaki M, Ito H, Nakagawa K, Shimizu H, Kato A, et al. Resection of hepatic and pulmonary metastases in patients with colorectal carcinoma. *Cancer* 1998;82(2):274-8.
 23. Goldberg RM, Fleming TR, Tangen CM, Moertel CG, Macdonald JS, Haller DG, et al. Surgery for recurrent colon cancer: strategies for identifying resectable recurrence and success rates after resection. Eastern Cooperative Oncology Group, the North Central Cancer Treatment Group, and the Southwest Oncology Group. *Ann Intern Med* 1998;129(1):27-35.
 24. Zanella A, Marchet A, Mainente P, Nitti D, Lise M. Resection of pulmonary metastases from colorectal carcinoma. *Eur J Surg Oncol* 1997;23(5):424-7.