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Surgical treatment of liver metastases from colorectal carcinoma in elderly patients. When is it worthwhile?

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Abstract *Background:* The elderly are under-represented in series of patients operated on for colorectal liver metastases (LM). *Objective:* To analyse the influence of age on surgery of colorectal LM, and the identification of factors that could be used as exclusion criteria. *Patients and methods:* Six hundred and forty-eight patients underwent liver resection between 1990 and 2006. Demographic data, primary tumour related variables, stage of the disease, morbidity, mortality, survival and recurrence were prospectively recorded. *Results:* One hundred and sixty of 648 patients (25%) were 70 years old or older. Postoperative mortality was significantly higher in elderly patients (8% *vs.* 3%, p=0.008). Morbidity was also higher (41% *vs.* 34%, p=0.008). Survival rate at 1, 3 and 5 years was 88%, 62% and 45% respectively in patients younger than 70 years, and 82%, 48% and 36% in the elderly (p=0.007). Excluding the postoperative mortality, the figures were 90%, 64% and 46%. 90%, 53% and 38% (p=0.061). Disease-free survival rates at 1, 3 and 5 years excluding postoperative mortality were 68%, 32% and 25% in younger patients, compared to 68%, 34% and 30% (p=0.71) in the elderly. Major liver resections increased mortality in the elderly. In the multivariate analyses only a tumour size equal to or more than 10 cm significantly increased the postoperative mortality risk in elderly patients. *Conclusions:* The elderly have a higher mortality. In recent years that difference has been markedly reduced. Excluding the postoperative mortality, the overall survival and disease-free survival are similar between both groups. The criteria to indicate surgery must be the same in both groups.

Key words Liver surgery • Metastases • Colorectal cancer • Elderly patients • Old patients • Human • Chemotherapy • Hepatectomy

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Introduction

Ageing of the population is a major health problem that affects western society and its importance has been steadily increasing in the last decades. Consequently, an increasing number of elderly patients need surgical treatment. The specific inconveniences and difficulties related to that situation have been analysed in diverse publications dealing with different kinds of surgical interventions [1, 2].

In the field of liver surgery in the elderly, the most frequent indication consists of colorectal liver metastases (LM). Taking into account that more than 50% of colorectal carcinomas (CRC) are diagnosed in patients older than 70 years [3], the logical consequence would be that between 30% and 50% of patients with LM from this origin would belong to that age group. However, in the published series, only 8–15% of patients treated by hepatic resections are older than 70 years [3–6]. This difference suggests that, despite the evidence that confirms the safety of hepatic surgery in the elderly [4, 5, 7–9], an important percentage of these patients are not referred for curative surgical treatment. This is probably because oncologists still have doubts about the possible benefits that liver surgery can obtain in this group of patients. These benefits would be counterbalanced by an increased postoperative morbid/mortality and by the limited life expectancy of elderly patients.

The primary objective of this study was to evaluate the influence of old age on the results of surgery of colorectal LM. We also tried to identify those staging variables of the disease that could contraindicate liver surgery in the elderly.

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Patients and methods

Between January 1990 and June 2006, 648 patients underwent surgery for LM of CRC at both centres participating in the study. The patients were classified into two groups according to age. The first group included 488 patients younger than 70 years, and the second 160 patients aged 70 years or older. As expected, through the prolonged period of the study, many changes have been introduced in the surgical technique and postoperative care, along with a constant increase in the expertise of the surgical team and anaesthesiologists. To assess the possible influence introduced by these changes, we decided to divide our experience into two groups. In the first were included the first 200 hepatectomies performed during the period 1990–1998, and in the second, the remaining resections. During this second period, the number of liver resections was more than 50 cases per year. In the same period we introduced systematically diverse aspects of surgical technique and perioperative care that can contribute to improvements in the results. Among them: ultrasonic dissector (CUSA, Tyco Healthcare, Mansfield, MA), hilar intermittent clamping for periods of 15 min followed by 5-min reperfusion periods, Central Venous Pressure lower than 5 mmHg during the phase of liver transection, and techniques to maintain normothermia during the intervention.

Demographic data, primary tumour characteristics, surgical technique, histopathology of the resected liver specimen, postoperative evolution and results related to recurrence and survival were obtained from a prospectively collected database maintained from the beginning of our experience.

The criteria used to indicate the surgical treatment and the surgical technique were the same for all patients included in the study at both participating centres. Selection criteria for liver resection included medical fitness for major surgery with no sign of disseminated disease on preoperative imaging. There were no predefined criteria for resectability with regard to the number or size of the tumours, bilobarity, locoregional invasion or the presence of extrahepatic disease, except that resection had the potential to be complete and macroscopically curative. The preoperative imaging studies were abdominal dual-phase (portal and equilibrium) helical computed tomography (CT). Details of the technique and results have been reported previously [10]. Disseminated disease was ruled out by CT of the chest and pelvis. Colonoscopy was repeated in the absence of a normal examination. PET/CT FDG was performed during the last four years in patients suspected of presenting extrahepatic disease. The histopathological report of the primary tumour was reviewed in order to confirm that the first resection was complete. Biochemical profile included blood count, measurements of serum transaminases, bilirubin, carcinoembryonic antigen (CEA) and CA 19-9 tumour markers, and blood coagulation. Radiographic studies were reviewed at a twice-weekly multidisciplinary meeting and surgical resection was scheduled if considered appropriate. All patients gave written informed consent to undergo surgery.

Patients with synchronous hepatic metastases were considered for partial colectomy and hepatic resection. The criteria for chemotherapy were the same at both institutions. All patients were referred to their oncologist to evaluate the indication of adjuvant chemotherapy. Preoperative evaluation was made by the anaesthesiology department, consulting other specialists whenever it was considered appropriate. A portal venous embolisation was indicated in those cases where the future hepatic remnant was expected to be less than 30%.

Definitions

Postoperative mortality: All deaths during the first 30 days following the surgical procedure, or during the same hospital admission in those cases in which hospital stay was longer than 30 days.

Postoperative hepatic failure: The presence of two or more of the following: prothrombin time ratio >2, jaundice with bilirubin levels >50 μmol/l on the 5th day, ascites that needed treatment or encephalopathy [11].

Major hepatectomy: The resection of 3 or more segments according to Couinaud's nomenclature.

The surgical technique used for major hepatectomies included previous ligature and section of the corresponding branch of the hepatic artery, portal vein and biliary duct. Hilar clamping, total or selective, was indicated on an individual basis. In patients with chronic hepatopathy or with cirrhotic liver and in older patients the use of selective clamping was preferred when a minor hepatic resection was indicated [12, 13]. In those cases in which total hilar clamping was indicated, it consisted of ischaemic periods of 15 min followed by 5 min of reperfusion.

Follow-up

After the first liver resection, all patients were followed every 6 months with liver function tests, helical CT, CEA and CA19-9 levels. Colonoscopy was performed every two years. Repeat hepatectomy was considered if further liver recurrence was technically resectable and if helical CT scan of the chest, abdomen and pelvis revealed no unresectable extrahepatic recurrence. The resectability of recurrences in the lung was discussed with the thoracic surgeons. Any recurrences that were deemed operable were resected, including locoregional or anastomotic recurrences. During the last 6 years, radiofrequency (RF) interstitial destruction was used in combination with resection for otherwise unresectable patients [14].

Table 1 Epidemiological and oncological data of the primary tumour. Numbers in parenthesis are percentages

	Patients older than 70 years		
	No (*n*=488)	Yes (*n*=160)	*p*
Gender male (%)	307 (63)	119 (74)	*0.009*
Age years±SD	57.6 ± 8.4	73.7 ± 3	*0.00*
Primary rectum	176 (36)	54 (34)	0.33
Preoperative CEA ng/ml±SD	34.5 ± 71	39.5 ± 73	0.55
Dukes stage			
A	10 (2)	1	0.157
B	161 (33)	64 (40)	
C	313 (65)	94 (59)	
pT1	10 (2)	0	0.85
pT2	43 (9)	16 (10)	
pT3	43 (70)	121 (76)	
pT4	12 (20)	21 (13)	
pT1+pT2	53 (11)	17 (11)	0.51
pT3+pT4	426 (89)	142 (89)	
pN0	171 (36)	68 (43)	0.26
pN1	190 (39)	56 (35)	
pN2	121 (25)	35 (22)	
pN0	171 (36)	68 (43)	*0.06*
pN1+pN2	311 (64)	91 (57)	
Lymph nodes positives for CRC	2.36±3	2.3±3.2	0.86
Adjuvant Ch after CRC operation	258 (54)	86 (54)	1
POPE	24 (5)	3 (2)	0.11
Neoadjuvant Ch before hepatectomy	130 (27)	32 (20)	*0.06*

pT, pN, Pathological Classification of the International Union Against Cancer. POPE, preoperative portal embolisation

Statistical analyses

Categorical data were analysed using Fisher's exact test. Continuous data are expressed as mean (SD) and were analysed using the unpaired Student's t-test. Overall survival was estimated using the Kaplan–Meier method and compared with log-rank test. Two-tailed level of significance was defined as $p<0.05$. Multivariate logistic regression was used to detect prognostic factors of postoperative mortality. Data were managed using a SPSS software package (SPSS Inc, Chicago, IL).

Results

Elderly patients represented 25% of patients in our series, but this percentage increased from 18% to 28% (p=0.008) from the first time period to the second. The mean age was 73.7 years in the elderly. 57.6 years in the younger group. We did not find significant differences between groups in terms of staging of the primary tumour, indication of adjuvant chemotherapy after colonic surgery and neoadjuvant chemotherapy before liver surgery (Table 1).

The results related to the surgical technique such as the type of liver resection, duration of the procedure, necessity of blood or plasma transfusion and utilisation of RF were all similar in both age groups, as was the postoperative hospital stay (Table 2).

The proportion of patients with extrahepatic disease was 15% among the elderly and 16% in the younger group (p=0.49). The localisation of the extrahepatic disease was not different between groups (Table 3).

Staging of the disease

The main differences were observed in the staging of the liver disease (Table 4). Synchronous metastases were less frequent, and the interval between colonic and hepatic surgery longer (19.8±26 *vs.* 13.8±14.7 months, p=0.001) in the elderly group.

The number of LM was lower among the elderly. Isolated LM was found in 51% *vs.* 42% in the elderly and younger groups respectively (p=0.03). However, the size of the LM was significantly greater in the elderly than in the younger group (4.2±2.6 *vs.* 3.7±2.1 cm; p=0.009). Lesions larger than 10 cm occurred in 5% *vs.* 1% in the elderly and younger patients, respectively.

Postoperative outcome

Postoperative mortality was greater in the elderly (8% *p* 3%, p=0.008). The morbidity was also greater (41% *vs.* 34%, p=0.008), mainly due to a higher incidence of respiratory complications (Table 5). However, these differences in mortality and morbidity disappeared in the second study period (5.6% *vs.* 2.5%, p=013 for mortality

Table 2 Surgical data. Numbers in parenthesis are percentages

	Patients older than 70 years		
	No (*n*=488)	Yes (*n*=160)	*p*
Simultaneous surgery	50 (10)	11 (7)	0.13
Hepatectomy technique			0.75
Extended hepatectomy	66 (14)	11 (1)	
Right hepatectomy	116 (24)	41 (26)	
Left hepatectomy	53 (11)	19 (12)	
Bi- or unisegmentectomy	132 (27)	48 (20)	
Limited resection	62 (13)	56 (35)	
Others	57 (12)	24 (15)	
RF only	2	1	
Major hepatectomy	292 (60)	95 (59)	1
RF complementary	40 (8)	14 (9)	0.87
No Pringle	51 (11)	18 (11)	0.85
Duration of hilar clamping (minutes)	35.7±22	33±21	0.18
Transfusion	74 (15)	27 (17)	0.32
Duration of surgery	274±80	269±64	0.48
Postoperative stay	11.4±7.7	12.3±11	0.4

RF, radiofrequency ablation

Table 3 Extrahepatic disease. Numbers in parenthesis are percentages

	Patients older than 70 years		
	No (*n*=488)	Yes (*n*=160)	*p*
Extrahepatic disease	76 (16)	24 (15)	0.49
Locoregional recurrence	19 (4)	3 (2)	0.17
Pedicular lymph nodes	12 (3)	5 (3)	0.41
Carcinomatosis	8 (2)	1	0.31
Pulmonary metastasis	30 (6)	6 (4)	0.05
Diaphragmatic invasion	10 (2)	8 (5)	0.06
Others	5 (1)	1	0.54
Several extrahepatic sites	6 (1)	0	0.18

and 37% *vs.* 30%, p=0.17 for complications). On the contrary, in the first 200 hepatectomies a higher mortality was observed among the elderly (14% *vs.* 3%, p=0.018). No differences were found either in the incidence of postoperative hepatic failure or in the other complications directly related to the hepatectomy.

Table 4 Pathological data. Numbers in parenthesis are percentages

	Patients older than 70 years		
	No (*n*=488)	Yes (*n*=160)	*p*
Synchronic presentation	239 (49)	63 (39)	*0.036*
Interval CRC and hepatectomy (months), mean±SD	13.8±14.7	19.8±26	*0.000*
Bilobar situation	211 (43)	59 (37)	0.09
Number of LM, mean±SD	2.8±2.9	2.2±1.9	*0.03*
Solitary LM	204 (42)	81 (51)	*0.03*
LM≥4	120 (25)	29 (18)	*0.05*
Size (cm) mean±SD	3.7±2.1	4.2±2.6	*0.009*
Size >5 cm	98 (20)	40 (25)	0.11
Size >10 cm	7 (1)	8 (5)	*0.02*
Margin (cm), mean±SD	0.99±0.8	1±1	0.95
Margin invasion	65 (13)	24 (15)	0.33

Table 5 Mortality and morbidity. Numbers in parenthesis are percentages

	Patients older than 70 years		
	No (*n*=488)	Yes (*n*=160)	*p*
Mortality	13 (3)	12 (8)	*0.008*
Morbidity	164 (34)	66 (41)	*0.05*
Wound infection	27 (6)	9 (6)	0.55
Biliary fistula	38 (8)	17 (11)	0.17
Intrabdominal abscess	34 (7)	8 (5)	0.25
Pneumonia	4 (1)	7 (4)	*0.007*
Haemoperitoneum	8 (2)	2 (1)	0.53
Hepatic insufficiency	41 (8)	18 (11)	0.18
Others	61 (14)	26 (18)	0.12
Reoperation	18 (4)	5 (3)	0.48
Readmission	24 (5)	6 (4)	0.08

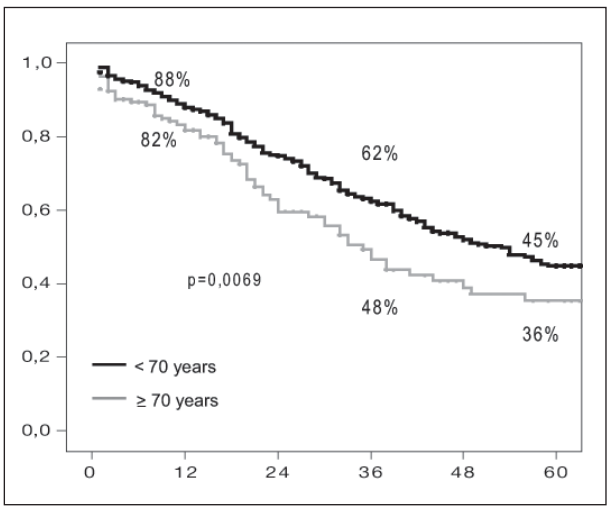

Fig. 1 Actuarial patient survival in young (<70 years) and old patients (>70 years)

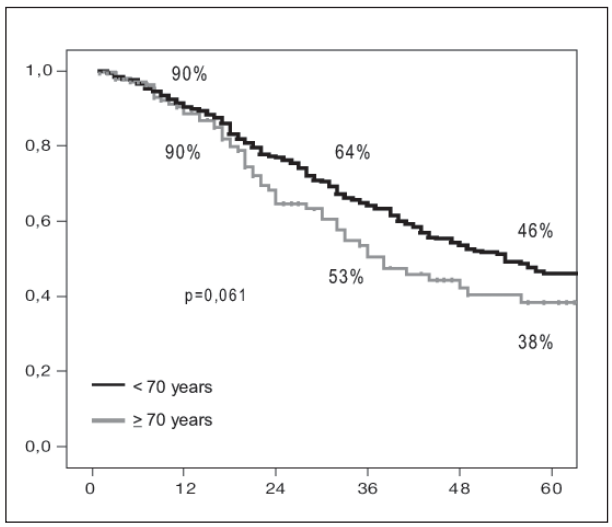

Fig. 2 Actuarial patient survival excluding postoperative mortalities in young (<70 years) and old patients (>70 years)

Survival and recurrence

The mean time of follow-up was 31±28.8 months, although it was slightly less in the elderly group (24±23 *vs.* 33±30 months). Survival rates at 1, 3 and 5 years were 88%, 62% and 45% respectively in the younger group, and 82%, 48% and 36% respectively in the elderly group (p=0.0069) (Fig. 1). Excluding postoperative mortality the figures were 90%, 64% and 46% *vs.* 90%, 53% and 38% (p=0.061) (Fig. 2).

During the follow-up, recurrence of the disease was diagnosed in 46% and 57% of elderly and younger patients respectively (p=0.012). These differences could be explained by a higher incidence of hepatic and loco-regional recurrences in the younger group (Table 6). Only 50% of the elderly patients received adjuvant chemotherapy compared to 70% in the younger group (p<0.001).

Disease-free survival rates, excluding the postoperative mortality, at 1, 3 and 5 years were 68%, 32% and 25% for the younger group whilst they were 68%, 34% and 30% in the elderly group (p=0.71) (Fig. 3). The incidence of hepatic recurrence was also similar: 25%, 47% and 50% *vs.* 22%, 43% and 46% (p=0.47) (Fig. 4).

Prognostic factors

None of the variables associated with hepatic staging of the disease (synchronous metastases, bilobar disease, number of LM >4, size >10 cm) significantly influenced the long-term survival.

In the univariate analyses of the preoperative variables related to postoperative mortality in patients older than 70 years, two significant risk factors of mortality were identified: major hepatic resection (11.6% *vs.* 1.6%, p=0.028) and a tumoral size >10 cm (37.5% *vs.* 5.9%, p=0.015).

Table 6 Outcome and recurrence. Numbers in parenthesis are percentages

	Patients older than 70 years		
	No (*n*=488)	Yes (*n*=160)	*p*
Recurrence	278 (57)	74 (46)	*0.012*
Liver	175 (36)	45 (28)	*0.044*
Pulmonary	122 (25)	32 (20)	0.11
Loco-regional	100 (21)	19 (12)	*0.008*
Others	71 (15)	22 (14)	0.46
Multiple sites	125 (26)	35 (22)	0.19
Adjuvant chemotherapy	315 (70)	72 (50)	*0.000*

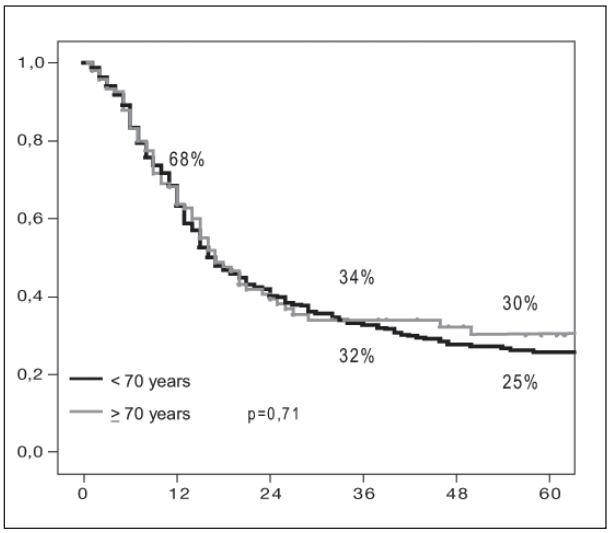

Fig. 3 Actuarial disease-free survival in young (<70 years) and old patients (>70 years)

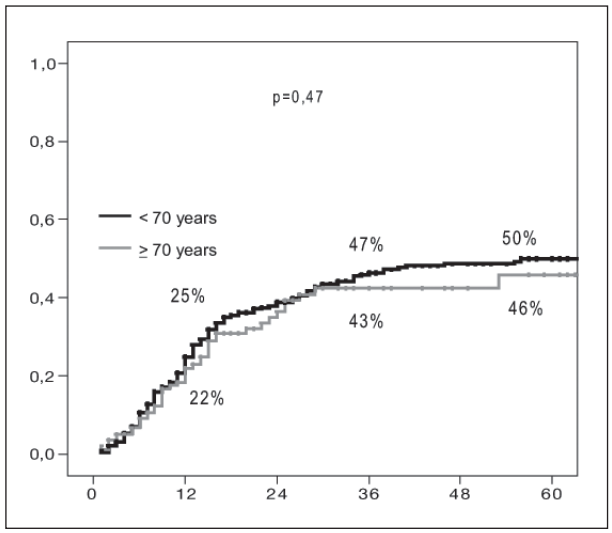

Fig. 4 Specific hepatic recurrence rate in young (<70 years) and old patients (>70 years)

Age >75 years, number of lesions, previous neoadjuvant chemotherapy, bilobar localisation and extrahepatic disease were also analysed. None of these factors was associated with a higher postoperative mortality (Table 7).

In the multivariate analyses through the logistic regression model, only tumoral size larger than 10 cm significantly increased the postoperative mortality risk in the elderly group (Table 8). When the same model was applied to the younger group, none of the variables reached statistical significance.

Discussion

Many publications have suggested that major abdominal surgery due to cancer can be performed safely in elderly patients with good results and the preoperative selection must be based on physiologic criteria and performance status rather than on chronological aspects [2, 15, 16]. However, in the publication of Polanczyk et al. [1], in which 4315 patients were included and stratified into 4 age groups, after adjusting for functional status and type of surgery, they concluded that elderly patients have an increased risk of postoperative complications. Age was an independent predictive factor of prolonged hospital stay in a multivariate predictive model in which variables such as sex, race, ASA classification and type of surgical procedure were included. In the results of this study the high prevalence of non-cardiac perioperative, especially respiratory, complications is notorious. Therefore, the assessment of the perioperative risk should not be focused solely on cardiac risk. This observation is coincident with our experience, in which the frequency of respiratory complications in elderly patients was significantly higher than in younger patients.

The evident higher fragility in elderly patients makes careful selection of candidates for major surgery necessary. With this objective in mind, several score systems can be used to assess the operative risk such as the Physiologic and Operative Severity Score for the enUmeration of Mortality and Morbidity (POSSUM) [17] or the Acute Physiology and Chronic Health Evaluation (APACHE) [18]. Models to predict specifically the post-

Table 7 Factors related with mortality in patients older than 70 years

Factors		Mortality (%)	*p*
Gender	Male (*n*=119)	7.6	0.95
	Female (*n*=41)	7.3	
Primary	Colon (*n*=106)	8.5	0.5
	Rectum (*n*=54)	5.6	
Dukes	A (*n*=1)	0	
	B (*n*=64)	6.3	
	C (*n*=94)	7.4	
Dukes	A+B (*n*=65)	7.6	
	C (*n*=94)	7.4	
Type of LM	Synchronic (*n*=63)	7.9	0.86
	Metachronic (*n*=97)	7.2	
Interval CRC & LM operation	<12 months (*n*=20)	5.3	0.3
	>12 months (*n*=43)	9.5	
Size	<5 cm (*n*=120)	5.0	*0.04*
	>5 cm (*n*=40)	15.0	
	<10 cm (*n*=152)	5.9	*0.01*
	>10 cm (*n*=8)	37.5	
Number of LM	Solitary (*n*=81)	6.2	0.5
	>1 LM (*n*=79)	9.0	
	<4 LM (*n*=131)	6.9	0.52
	≥4 LM (*n*=29)	10.3	
Adjuvant chemotherapy post CRC operation	Yes (*n*=86)	8.1%	0.52
	No (*n*=74)	5.6	
Bilobar	Yes (*n*=59)	10.2	0.32
	No (*n*=101)	5.9	
POPE	Yes (*n*=3)	66.7	*<0.001*
	No (*n*=157)	6.4	
Neoadjuvant chemotherapy	Yes (*n*=32)	9.4	0.65
	No (*n*=128)	7.0	
Liver resection	Major (*n*=95)	11.6	*0.02*
	Minor (*n*=65)	1.6	
Simultaneous surgery of CRC and LM	Yes (*n*=11)	0	0.33
	No (*n*=149)	8.1	
Extrahepatic disease	Yes (*n*=24)	8.3	0.86
	No (*n*=138)	7.4	
Margin invasion	Yes (*n*=24)	12.5	0.32
	No (*n*=136)	6.7	
Morbidity	Yes (*n*=66)	18.2	*<0.001*
	No (*n*=94)	0	
Reoperation	Yes (*n*=5)	40	*0.005*
	No (*n*=155)	6.5	

POPE, preoperative portal embolisation

operative mortality in elderly patients operated for CRC have been designed [19]. It would be desirable to develop new specific predictive systems for liver surgery in the future. The reduction in postoperative morbid/mortality in our series is probably due to a better selection of patients and improvements in postoperative care introduced in recent years.

Surgery offers the only chance for cure in patients with colorectal LM. Those patients without treatment have a mean survival rate of 4–7 months, and those treated by chemotherapy, 9–22 months. Therefore, all patients with this pathology should be considered for surgical treatment, regardless of their age. However, the low frequency of synchronous LM diagnosed in our eld-

Table 8 Factors related with postoperative mortality in patients older than 70 years

	p	Risk ratio	95% CI	
Type of hepatectomy (major *vs.* minor)	0.057	8.06	0.94	68.96
Size of tumour (≥10 cm *vs.* <10 cm)	0.035	5.95	1.13	31.25
Age	0.11	1.17	0.96	1.43
Gender	0.80	1.19	0.27	5.14

erly patients suggests that possibly the initial staging is less exhaustive than in younger patients. Furthermore, the higher frequency of tumours larger than 10 cm suggests that follow-up is less strict.

Fortunately, if we take into account only the last 200 cases, the percentage of elderly patients with diagnoses of synchronous LM reaches 45% and patients with tumours larger than 10 cm is less than 2%. Therefore, we can conclude that in recent years, an important change of attitude toward the diagnoses and follow-up of these patients has taken place.

One of the reasons that could explain the "surgical nihilism" in elderly patients with LM of CRC is the assumption that the livers of these patients do not tolerate surgery in the same way those of younger patients do. Regarding this, there is some classical experimental evidence that the ageing process is associated with deterioration of hepatic function as a consequence of mitochondrial [20] and Kupffer cell alterations [21]. However, two recent clinical studies [7, 8] demonstrated that the there was no significant difference in evolution of various biochemical parameters (prothrombin time, bilirubin, transaminases, gamma-glutamyl transpeptidase and alkaline phosphatase) after a right hepatectomy between two different age groups. In our experience, the incidence of postoperative hepatic failure was not higher in the elderly patients, despite a similar percentage of major liver resections. Other evidence in favour of the important functional reserve and capacity of regeneration of the liver in the elderly is their frequent use in cadaveric liver transplant.

Despite the previous statement, and our results, the performance of major hepatic resections in elderly patients represents an evident increase in the mortality risk. This increase is especially significant in those patients with large metastases that need major resections. Although in our recent results the risk seems to be diminishing, we think it is reasonable to recommend that the future hepatic remnant be larger than the usually recommended 30%. This objective can be achieved in some cases by a combination of limited resections and RF ablation.

The second reason to doubt the benefits of surgery in elderly patients is their reduced life expectancy and the idea that death will occur by non-tumoral causes during the follow-up. With respect to this, Turrini et al. [22] compared the evolution of two groups of patients aged between 70 and 80 years, all of them with less than four resectable metachronous LM. The first group consisted of 15 patients treated by hepatectomies and without neoadjuvant chemotherapy to avoid deterioration in liver function. The second group consisted of 18 patients treated only with chemotherapy due to a high perioperative risk. The survival rates at 2 years were respectively 73% and 50% (p=0.04). With a median follow-up of 49 months, no patients died of a cause other than colorectal cancer disease during observation time. It can be concluded that the resection of LM offers benefits in terms of survival compared to non-operated elderly patients.

From our data we can conclude, excluding the postoperative mortality, that the results of overall survival, disease-free survival and hepatic recurrence are not significantly different when compared with those obtained in younger patients.

The results obtained with repeat hepatic resections due to recurrences of LM in the elderly group did not allow us to draw clear conclusions. However, it seems reasonable to avoid surgery whenever extrahepatic disease is detected. In the experience published by Zacharias et al. [4], all patients in whom a repeat resection was performed died before 5 years and all recurred within 3 years. RFA could be an alternative treatment in these cases.

Conclusions

In our experience, mortality after surgery for colorectal LM in patients older than 70 years is increased compared with younger patients. This difference in mortality between different age groups is no longer significant in our recent experience. Mortality is caused mainly by non-hepatic complications. It is important to design protocols of selection and perioperative care in order to decrease the incidence of these causes of mortality. Major hepatic resections in the elderly are associated with an increased risk of perioperative mortality. The long-term results of surgical treatment of colorectal LM are the same as those that can be obtained in younger patients, therefore the criteria to indicate hepatic surgery should be the same in both groups.

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