



## Oncology

Management of rectal cancers in relation to treatment guidelines:  
a population-based study comparing Italian and French patients

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## ABSTRACT

**Background:** Few studies have investigated rectal cancer management at the population level. We compared how rectal cancers diagnosed in Italy (2003–2005) and France (2005) were managed, and evaluated the extent to which management adhered to European guidelines.

**Methods:** Samples of 3938 Italian and 2287 French colorectal cancer patients were randomly extracted from 8 and 12 cancer registries respectively. Rectal cancer patients (860 Italian, 559 French) were analysed. Logistic regression models estimated odds ratios (ORs) of being treated with curative intent, receiving sphincter-saving surgery, and receiving preoperative radiotherapy.

**Results:** Similar proportions of Italian and French patients were treated with curative intent (70% vs. 67%; OR = 0.92 [0.73–1.16]); the respective proportions receiving sphincter-saving surgery were 21% and 33% (OR = 1.15 [0.86–1.53]). In about 50% of those treated with curative intent, ≥12 lymph nodes were harvested in both countries. The proportion receiving postoperative radiotherapy was higher in Italy than in France (25% vs. 11%,  $p < 0.01$ ), but French patients were more likely to receive preoperative radiotherapy (52% vs. 21%; OR = 4.06 [2.79–5.91]).

**Conclusion:** The proportions of patients receiving preoperative radiotherapy and the numbers of lymph nodes sampled were low in both countries. Centralising treatment and potentiating screening would be practical ways of improving outcomes and adhering to guidelines.

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## 1. Introduction

Rectal cancers constituted 38% of large bowel cancers diagnosed in Europe from 1995 to 1999. Over the same period, five-year relative survival for rectal cancer was modest at 53% [1]. Since then, however, rectal cancer management has changed profoundly. The proportion of patients receiving surgery with curative intent has increased [2]. The use of total mesorectal excision [3] and low anastomosis for low anterior resection (facilitated by the availability of circular endoluminal staplers) has also increased [4]. Additionally, effective preoperative radiotherapy protocols have been developed

[5] and early postoperative care improved [6]. These changes were mainly initiated and implemented by specialised centres, and clinical studies indicate reduced recurrence rates and improved survival [7,8].

Nevertheless, results from clinical studies may not reflect the results for all rectal cancer patients, mainly because of referral bias [9]. Population-based cancer registry studies – which analyse all diagnosed patients in well-defined populations – are potentially able to assess the global effects of advances in cancer treatment and management. However, detailed information on diagnostic procedures, stage at diagnosis, and treatment is not usually available to cancer registries. To overcome this, we performed a High Resolution study in which detailed clinical information on representative samples of cancer registry cases was obtained from clinical records.

Because of the difficulties and expense of accessing clinical data, few population-based studies on rectal cancer management and compliance with treatment guidelines have been conducted in Europe [2,10–14]. Consensus guidelines are evidence-based recommendations as to the best available treatment, adherence to which

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offers the best possible outcomes. If guidelines are not adhered to, their adoption may improve survival. The aims of the present study, carried out as part of EUROCARE [15], were to comparatively analyse how rectal cancer was managed at the population level in Italy and France, and assess the extent to which rectal cancer management adhered to European guidelines.

## 2. Materials and methods

### 2.1. Populations

Data from 8 Italian cancer registries (North/Central: Biella, Firenze, Modena, Reggio Emilia, Romagna; South: Napoli, Ragusa, Sassari) and 12 French registries (North/Central: Bas-Rhin, Calvados, Côte d'Or, Dôbes, Finistère, Haut-Rhin, Loire Atlantique, Manche, Saône et Loire; South: Hérault, Isère and Tarn) were analysed. Adult ( $\geq 15$  years) colorectal cancer cases (coded according to the International Classification of Diseases for Oncology, 3rd revision, ICD-O-3 codes: C18-C21 [16]) were randomly sampled from each registry. About 500 cases per cancer registry from Italy were sampled, which were balanced for the year of diagnosis from those diagnosed in 2003–2005 and present in the Italian Association of Cancer Registries database [17].

About 200 cases per cancer registry from France were sampled, on the basis of patient day and month of birth, from those diagnosed in 2005 and present in the French Network of Cancer Registries database [18].

The clinical documentation of each patient was reviewed by registry personnel to abstract the data required by the study protocol. In situ cancers, non-epithelial cancers, and cases known by death certificate only were excluded, leaving 3938 Italian and 2287 French colorectal cancer cases. Patients with invasive adenocarcinoma of the rectal ampulla, extending 15 cm from the anal verge and coded as C20, were included in the present study: 860 Italian patients and 559 French patients.

### 2.2. Variables investigated

Age at diagnosis was categorised into four groups: <65, 65–74, 75–84,  $\geq 85$  years. Treatments were categorised as: surgery with curative intent; surgery with palliative intent; radiotherapy, chemotherapy or both without surgery; symptomatic treatment, including colostomy alone; unknown; and none. Surgery with curative intent removed all macroscopically evident malignant tissue with no histological evidence of tumour at the resection margins. Since information on sphincter-preserving operations was not available, we considered that surgery performed with curative intent and additionally characterised by the presence of a temporary colostomy was sphincter-saving.

Surgical procedures comprised abdominoperineal resection, low anterior resection and protectomy, endoscopic polypectomy, and not otherwise specified (NOS) resections.

Chemotherapy and radiotherapy were categorised as pre-operative, postoperative and palliative. Stage at diagnosis was categorised as I, II, III or IV, corresponding to T1/2N0M0, T3/4N0M0, anyTN1/3M0, or M1, in accordance with the 6th edition of the TNM manual [19]. Patients without visceral metastasis who were not resected were assigned to an ad hoc ‘advanced’ category. If preoperative treatment was performed or pathological stage was unavailable, clinical stage was used. The total number of lymph nodes harvested during surgery (except endoscopic polypectomy) was categorised as <12,  $\geq 12$  and unknown. Data on elective surgery, whether or not preoperative imaging was used to detect distant metastases, histological/cytological (microscopic)

confirmation, and colostomy (temporary and permanent) were also analysed.

### 2.3. Statistical analyses

We analysed differences between Italian and French patients, their cancers and their treatments, using Chi-squared tests for homogeneity to test the significance of differences. Tests were two-sided, and differences considered significant at  $p < 0.05$  [20].

We used logistic regression modelling, estimating odds ratios (ORs) with 95% confidence intervals (CIs), to analyse differences in proportions of Italian and French patients receiving surgery with curative intent. Among patients who received surgery with curative intent, we also analysed differences in proportions of patients receiving sphincter-saving surgery, and of stage II and III patients receiving preoperative radiotherapy. Patients given endoscopic polypectomy and those undergoing an unknown surgical procedure (6 patients) were excluded from the latter analysis. All models included country, age, sex, and where appropriate, stage and surgical procedure, as covariates. The analyses were carried out using version 12 of the statistical package STATA [21].

## 3. Results

Of the 1419 rectal cancer patients, 61% were men, 68% were over 65 years, and about 70% were stage I–III at diagnosis (Table 1). Information on stage was missing in 4% of patients overall, more than 50% of whom were over 65 years (data not shown). Cancer was confirmed microscopically in 98% of patients overall, and pre-operative imaging investigations to detect distant metastases were performed in 85% of patients. Overall, 69% of patients underwent surgery with curative intent, 7% received palliative surgery (excluding colostomy), 12% received symptomatic treatment including

**Table 1**

Distribution (%) of characteristics of rectal cancer cases diagnosed in Italy ( $N = 860$ ) in 2003–2005 and in France ( $N = 559$ ) in 2005.

	Italy, N (%)	France, N (%)	p value <sup>a</sup>
<b>Male gender</b>	519(60.3)	344(61.5)	0.654
<b>Age at diagnosis (years)</b>			0.808
<65	270(31.4)	178(31.8)	
65–74	271(31.5)	164(29.3)	
75–84	253(29.4)	169(30.2)	
$\geq 85$	66(7.7)	48(8.7)	
<b>Stage at diagnosis</b>			0.006
I	183(21.3)	156(27.9)	
II	190(22.1)	108(19.3)	
III	205(23.8)	111(19.9)	
IV	167(19.4)	119(21.3)	
Advanced	60(7.0)	59(10.6)	
Unknown	55(6.4)	6(1.0)	
<b>Microscopic verification</b>	839(97.6)	551(98.6)	0.189
<b>Preoperative diagnostic imaging</b>	719(83.6)	492(88.0)	0.022
<b>Treatment</b>			
Surgery with curative intent	598(69.5)	377(67.4)	<0.001
Palliative surgery	76(8.8)	19(3.4)	
Radiotherapy, chemotherapy or both <sup>b</sup>	33(3.8)	51(9.1)	
Symptomatic treatment only <sup>c</sup>	89(10.4)	76(13.6)	
Unknown	16(1.9)	3(0.6)	
None	48(5.6)	33(5.9)	

<sup>a</sup> p values from Chi-squared test, after excluding unknowns for each variable analysed.

<sup>b</sup> No surgery.

<sup>c</sup> Including colostomy alone.

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