Assessment of management practices for colonic cancer in the Paris metropolitan area in 2002

Lina SILVÉRA (1), Gilles GALULA (1), Emmanuel TIRET (2), Christophe LOUVET (3), Jean-Louis LEROUX (1), Bernard TRUTT (1)


SUMMARY

Objective — To assess the management of patients aged 18 years or older with colonic adenocarcinoma (including the rectosigmoid junction), compared with French guidelines (ANAES and SOR).

Methods — This retrospective study carried out in 2003 by the Ile-de-France regional union of health insurance funds from hospital discharge and operative and pathology reports of patients exempted from copayment between April 2001 and March 2002.

Results — In all, 1 842 patients were included; mean age was 68.7 ± 12.7 years and the M/F ratio was 1.09. 17.3% of patients were diagnosed after complications (obstruction, perforation); 25.1% had synchronous metastases, 79.7% with at least one liver metastasis. Serum CEA assay was performed in 50.0% of patients, in combination with CA 19-9 in 31.1% of patients. In 24.9%, less than 8 lymph nodes were analyzed. 37.7% of stage II patients had chemotherapy while 10.8% of stage III and 9.8% of stage IV patients did not. Age was a determining factor in the decision of chemotherapy (P < 0.0001).

Conclusion — Implementation of guidelines for the management of colon cancer can be improved, notably regarding pathologic analysis and indications of chemotherapy.

RÉSUMÉ

Cancer du côlon en Ile-de-France : description et évaluation du respect des recommandations médicales en 2002

Lina SILVÉRA, Gilles GALULA, Emmanuel TIRET, Christophe LOUVET, Jean-Louis LEROUX, Bernard TRUTT

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Objectifs — Évaluer la prise en charge en Ile-de-France des mala-
des âgés de 18 ans et plus, atteints d’adénocarcinome colique (y compris charnière recto-sigmoïdale) par rapport aux recomman-
dations de l’ANAES et des SOR.

Méthodes — Cette étude rétrospective réalisée en 2003 par l’union régionale des caisses d’Assurance Maladie d’Ile-de-France à partir des comptes rendus d’hospitalisations, opératoires et d’anatomo-
pathologie.

Résultats — Ont été inclus 1842 malades exonérés du ticket modé-
rateur entre le 1er avril 2001 et le 31mars 2002. L’âge moyen était de 68,7 ± 12,7 et le sex-ratio H/F de 1,09. 17,3 % des malades ont été diagnostiqués au décours de complications (occlusions, perforations), 25,1 % avaient des métastases synchrones dont 79,7 % avec au moins une localisation hépatique. L’ACE était prescrit dans 50,0 % des cas, associé au CA19-9 dans 31,1 % des cas. Dans 24,9 % des cas moins de 8 ganglions ont été analysés. 37,7 % des stades II avaient eu de la chimiothérapie, 10,8 % des stades III et 9,8 % des stades IV n’en avaient pas eu. L’âge était un facteur déterminant dans la décision de chimiothérapie (P < 0,0001).

Conclusion — Le respect des recommandations médicales peut être amélioré, en particulier sur l’analyse anatomo-pathologique et les indications de la chimiothérapie.

Introduction

Colorectal cancer is the second leading cancer after breast cancer [1]. In France, the incidence of colorectal cancer was 36 000 new cases in 2000. In the Paris metropolitan area, the incidence of colonic cancer alone was estimated at 4000 cases annually [2].

Recent studies conducted by the Calvados [3] and Côte-d’Or [4] cancer registries have demonstrated differences in management practices in comparison with the guideline written by the ANAES consensus conference in 1998 [5]. These differences concern in particular the use of chemotherapy and pathological study of the operative specimen [5-7]. Data are not available on these points in the Paris metropolitan area where there is no cancer registry.

The Ile-de-France regional union of the Paris metropolitan area health insurance funds initiated a public health program with three objectives: describe patients with colonic adenocarcinoma, evaluate management practices in comparison with current guidelines, and propose actions for improvement if needed.

Method

This was a retrospective study on patient files. The study protocol was approved by the national commission on information and freedom.

Population

The French health insurance funds exempt from copayment of health expenditures patients who suffer from a specific list of long-term diseases. Among the beneficiaries of the three main health insurance funds of the Paris metropolitan area with exempted status, we selected patients with ICD (International Classification of Diseases 10th edition) codes C18.0 to C18.9 (cancer of the colon) and C19 (cancer of the rectosigmoid junction) who had been hospitalized or who had undergone surgery from April 1, 2001 to March 31, 2002. In 2002, these three funds provided health care insurance coverage for 96.7% of the population in the Paris metropolitan area [8].
We included all patients aged 18 years and over who had cancer of the colon or the rectosigmoid junction, then selected for study those with adenocarcinoma, i.e. the most frequent histological type found in 60-80% of patients [5]. Patients with in situ cancer or recurrent cancer or given care outside the Paris area were excluded from the study. Hereditary cancer and familial polyposis were also excluded in order to study management practices which could be compared meaningfully with current guidelines [5].

Data collection

Between April 1 and June 15, 2003, the medical-advisers of the health insurance funds completed a questionnaire using data collected from colonoscopy, hospital discharge, operative, and pathology reports. These reports were requested from the appropriate sources or were obtained directly from the hospital files. Information concerning examinations which had been performed outside the global budget setting (not-for-profit institutions) during the three months prior to registration of the exempted status was also collected using the health fund’s reimbursement databases.

The questionnaire had items for data concerning the patient, the disease, diagnostic procedures, search for extension, surgical treatment, pathological examinations, and chemotherapy. Operative or hospital discharge reports were analyzed to determine patient inclusion then to record questionnaire data. The working group included several gastroenterologists as well as several hospital experts.

Definitions

“Time to care” was defined as the number of days from diagnosis to surgery or to hospitalization in the event surgery was not undertaken.

Patients were considered to have a comorbid condition if they already had exempted status because of cardiovascular disease (excepting hypertension), type 1 diabetes, severe chronic respiratory failure, or cirrhosis.

Staging classifications were: TNM, Dukes, Astler and Coller and AJCC (American Joint Committee on Cancer) [9].

A “move” variable was defined to take into account the fact that some patients were hospitalized in an administrative district other than that of their residence.

Recurrence was defined as either the development of metachronous metastatic dissemination or the discovery of a new localization after surgery for a localized colon cancer.

In agreement with the experts, chemotherapy was considered “neoadjuvant” if it was administered before surgery for the colon cancer.

Standard practices

We assessed management practices in comparison with standard practices described in:

— guidelines issuing from the consensus conference held in January 1998 on “Prevention, Screening, and Treatment of Colon Cancer” which noted:
  — that all lymph nodes in the operative specimen should be studied and that no less than 8 nodes should be studied;
  — that, outside therapeutic trials, there is no indication for chemotherapy for AJCC stage II (Dukes B) cancer [4];
  — Standards, Options and Recommendations (SOR) [20] for the management of patients with colorectal cancer and the SOR for serum markers of colorectal cancer (June 2001) [10].

Data processing and statistical analysis

Data were validated and processed anonymously with an ACCESS® database. Statistical analysis was performed with SPSS® V9 (Statistical Package for Social Science) software. Chi-square test, Student’s t test, and ANOVA were applied as appropriate. Multivariate analysis (linear or logistic regression) was performed on chemotherapy and time to care variables. Statistical analysis on the time to care variable excluded complications and emergency procedures.

Results

We selected the files of 2 675 patients exempted from medical expenditures for the treatment of colon cancer. After exclusions and elimination of files with insufficient data, the study population included 1 842 patients (figure 1).

Study population

Mean age was 68.7 years (standard deviation (SD) 12.7, median 70.0, range 30-98 years). The 131 patients aged less than 50 years accounted for 7.1% of the study population while the 669 aged over 75 years accounted for 36.5%. The M/F sex ratio was 1.09: 962 men (52.2%) and 880 women (47.8%). Two hundred eleven patients (11.5%) had a comorbid condition. At least 320 patients (17.4%) died within two years of diagnosis and 203 (11.0%) within the first twelve months.

Diagnosis of colon cancer

The event leading to the diagnosis of colon cancer was, in decreasing order: development of functional disorders (transit disorders, abdominal pain, hematochezia) in 1 015 patients (55.1%), presence of anemia in 354 patients (19.2%), presence of a complication in 319 patients (17.3%) (including 258 patients with obstruction and 61 with perforation), screening colonoscopy in 55 patients (3.0%), and discovery of metastasis in 36 patients (2.0%). Data were missing for 63 patients (3.4%).

Diagnostic procedures

Colonoscopy was performed in 82.0% of patients (N = 1511) and was incomplete in 31.3% (N = 474). Colonoscopy was not performed in 230 patients (12.5%), including 71.8% who presented an obstructive or perforating complication. A barium study was performed after incomplete colonoscopy in 40.3% of patients (N = 191). A barium study was performed in 98 patients (5.3%) who did not have a colonoscopy, including 66 who had an intestinal obstruction (N = 59) or perforation (N = 7) and in 185 patients (12.2%) who had a complete colonoscopy which for 25 patients (1.7%) had been performed after an episode of obstruction.

The tumor was located beyond the left angle in 1005 patients (55%), and proximally in 791 (43%). In 2% of patients (N = 46), two synchronous localizations were discovered.

Search for extension

The search for extension included an ultrasonography (US) in 62.9% of patients (N = 1,159), a computed tomography (CT) of the abdomen in 47.4% (N = 873). Both explorations were performed in 28.9% of patients (N = 532). Neither US nor CT were performed in 10.1% of patients (N = 186).

Synchronous metastases were discovered in 463 patients (25.1%), with at least one hepatic metastasis for 79.7%. Among patients who had both US and CT, 40.8% had synchronous metastases. Among patients who had neither US nor CT, 25.3% had inaugural complications and 18.8% had synchronous metastases. Information concerning chest x-ray was available for 1 117 patients (60.6%). At least one serum marker was assayed before surgery in 50.9% of patients; CEA was assayed alone for 18.9% of patients and with CA19-9 for 31.1%. CA19-9 was assayed alone for 0.9% of patients.

Hospital stay and operation

All patients, whether they underwent surgery or not, were hospitalized; 43.7% in global budget (not-for-profit) institutions and 46.3% in private for-profit institutions (table I).

Mean time to care (from diagnosis to surgery or hospitalization) could be determined for 1 419 patients. It was 19.5 days for all patients considered (SD 3.0; median 15 d, range 0-255 d) and 20 days (SD 3.0) excepting patients with complications or...
emergency procedures. Multivariate analysis using nine variables identified three factors which after adjustment had an effect on time to care: discovery (by screening), move (to another administrative district), and tumor stage. The time to care was longer for stage I than for stage II and III (28 d, 17 d, and 19 d respectively; $P < 0.001$ ANOVA, $N = 1,193$). Time to care was also longer if the diagnosis was established after screening colonoscopy (33 d versus 19 d, $P < 0.001$, $N = 1,418$) and when the patient lived in a different administrative district from that of the institution (23 d versus 18 d, $P = 0.004$).

This “move” from one administrative district to another concerned 25.7% of patients. Most of these patients (53.2%) were hospitalized in Paris but lived in another administrative district in the Paris area. Inhabitants of Seine-Saint-Denis were concerned most often (41.1% versus 16.7% of Paris inhabitants, $P < 0.001$).

Nearly all patients (96.6%) underwent surgery. Laparotomy was performed for 89.7% of operated patients. Laparoscopy was used for 5.9% (N = 106) with conversion to laparotomy for 36/106 procedures (34.0%). Data on surgical approach were missing for 4.3% of patients. A curative procedure was performed in 70.9% of patients (N = 1,261) and a palliative procedure in 20.4% (N = 363). Data was missing for 8.7% (N = 155).

A colostomy was fashioned in 12.4% of patients (N = 220) and liver resection performed in 12.7% (N = 47).

**Pathological examination**

The pathology report was available for 90% of patients (N = 1,601). Tumor stage was mentioned for 94.1% of patients (N = 1,507). The TNM classification was used for 79.0% (N = 1,191), the Astler and Coller classification for 50.2% (N = 756), and the Dukes classification for 30.3% (N = 457). The overall total was greater than 1,507 because certain reports mentioned two or three classifications.
Table II. – Factors associated with chemotherapy among patients with colonic cancer by stage (logistic regression).

Facteurs explicatifs de la chimiothérapie pour des malades atteint d’un cancer du côlon pour chaque stade - régression logistique.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Significance</th>
<th>95% CI (OR)a</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>II</td>
<td>III</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0.062</td>
<td>0.1232</td>
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<tr>
<td>Female</td>
<td>standardb</td>
<td>standardb</td>
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<tr>
<td>Age group</td>
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<tr>
<td>&lt; 55 yrs</td>
<td>0.0000</td>
<td>0.0003</td>
</tr>
<tr>
<td>55 - 64 yrs</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>65 - 74 yrs</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>&gt;= 75 yrs</td>
<td>standardb</td>
<td>standardb</td>
</tr>
<tr>
<td>Comorbidity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>standardb</td>
<td>0.0007</td>
</tr>
<tr>
<td>no</td>
<td>0.34</td>
<td>standardb</td>
</tr>
<tr>
<td>Number of nodes studied</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a few</td>
<td>standardb</td>
<td>0.0465</td>
</tr>
<tr>
<td>&lt; 8</td>
<td>0.1967</td>
<td>0.0483</td>
</tr>
<tr>
<td>8 - 12</td>
<td>0.2319</td>
<td>0.0119</td>
</tr>
<tr>
<td>&gt; 12</td>
<td>0.2981</td>
<td>standardb</td>
</tr>
<tr>
<td>Inflammatory magma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>0.46</td>
<td>standardb</td>
</tr>
<tr>
<td>no</td>
<td>standardb</td>
<td>0.2138</td>
</tr>
<tr>
<td>District of residence</td>
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<td></td>
</tr>
<tr>
<td>75</td>
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<td>77</td>
<td>0.3578</td>
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<td>78</td>
<td>0.0942</td>
<td>standardb</td>
</tr>
<tr>
<td>91</td>
<td>standardb</td>
<td>0.5349</td>
</tr>
<tr>
<td>92</td>
<td>0.9646</td>
<td>0.5542</td>
</tr>
<tr>
<td>93</td>
<td>0.6728</td>
<td>0.4158</td>
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<td>94</td>
<td>0.8629</td>
<td>0.3615</td>
</tr>
<tr>
<td>95</td>
<td>0.5464</td>
<td>0.756</td>
</tr>
<tr>
<td>Type of institution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AP - HP</td>
<td>0.6 258</td>
<td>0.8386</td>
</tr>
<tr>
<td>Cancer Centers</td>
<td>0.6674</td>
<td>standardb</td>
</tr>
<tr>
<td>Military hospitals</td>
<td>standardb</td>
<td>0.7648</td>
</tr>
<tr>
<td>Private hospitals</td>
<td>0.6452</td>
<td>0.8594</td>
</tr>
<tr>
<td>PSPH</td>
<td>0.7526</td>
<td>0.7772</td>
</tr>
<tr>
<td>Public hospitals</td>
<td>0.6562</td>
<td>0.8707</td>
</tr>
</tbody>
</table>

a Confidence intervals are given only for significant parameters

b The probability of having chemotherapy was 5.6 to 35.4 times greater for a patient with stage III colonic cancer aged 65 - 74 years than for a patient aged 75 years or over; all other factors being the same as the “standard” patient.

AJCC staging could be noted for 1 450 patients: 156 (10.4%) stage I, 535 (35.8%) stage II, 464 (31.1%) stage III, and 295 (19.7%) stage IV. For 44 patients, classified as Dukes C or Astler and Coller C, the AJCC stage could not be determined. Likewise, the stage could not be noted for 13 other patients because the pathology report mentioned two stagings in disagreement.
Less than eight nodes were examined for 24.9% of patients (N = 399). The number varied with the type of institution (table III). Seventy pathology reports (4.4%) either stated “a few” nodes were examined or failed to mention node examination. According to the hospital discharge reports for 427 patients (23.2%), management was pluridisciplinary, but this information was missing in 56.0% of the reports.

**Treatment**

Chemotherapy was administered in 53.1% of patients (N = 978). Data were missing for 19.7% (N = 362). A neoadjuvant treatment was used for 12 patients (2.1%), adjuvant treatment for 599 (61.1%) and palliative treatment for 274 (45.7%). Data were missing for 93 patients given chemotherapy.

Chemotherapy was adjusted to tumor stage (table IV). Chemotherapy was administered in 5.8% of patients with stage I tumor, 37.7% with stage II, 76.9% with stage III, and 81.4% with stage IV. 9.8% of patients with stage III tumor were not given chemotherapy. Among the 535 stage II patients, the number of nodes examined was not in compliance with guidelines for 117 (21.9%). 99 pathology studies examined less than eight nodes, 13 pathology reports did not give the number of nodes examined, and five pathology reports noted that “a few” nodes were examined. Among these 117 patients, 47 were given chemotherapy (40.2%) compared with 139/385 (36.1%) of those whose number of examined nodes was in compliance with guidelines (NS).

It was noted that 70/117 (59.8%) stage II patients who had less than eight nodes examined were not given chemotherapy and that 46/202 (22.8%) of stage II patients given chemotherapy had a diagnosis established because of obstruction (N = 37) or perforation (N = 9).

Applying multivariate analysis to the whole data set revealed that several factors had an influence on whether or not chemotherapy was administered (P < 0.001). Age had an impact since the probability of chemotherapy was 1.98-fold higher among women (P = 0.0037). For stage II and stage IV patients, the only factor linked with the probability of having chemotherapy was age (table II). For stage II patients, the probability of having chemotherapy was greater among the younger patients (P < 0.001); the probability of having chemotherapy was 19 times greater among subjects aged less than 55 than among those aged 75 or over. For stage IV patients, the probability of chemotherapy for patients aged 65–74 years was 54 times greater than those aged 75 or over (P < 0.0001).

For stage III patients, factors linked with administration of chemotherapy were age, number of nodes studied, district of residence, and presence of associated comorbid condition (table III).

**Discussion**

Our study population of 1,842 patients with sporadic adenocarcinoma of the colon corresponds to nearly half of the expected incident cases [2]. It enabled an examination of management practices in the Paris metropolitan area which does not have a cancer registry. Pathology (less than eight nodes examined for 24.9% of patients) and chemotherapy practices could be studied. The limitations of this study include:

— possible inclusion bias since all patients with long-term disease who could benefit from full exoneration from copayment for medical expenditures do not make the required request, leading to a medicosocial underestimated incidence [11],

— missing data due to the collection method.

Factors leading to an underestimation of exempted status in cancer patients are more marked in the elderly population since such patients may already be exonerated from copayment because of another disease. Since the mean age in our population was close to 69 years, a certain number of stage I patients may already have had the exempted status, awarded automatically for surgical procedures coded > 50KCC on the fund’s cost schedule. Since stage I cancer of the colon does not require adjuvant treatment, these patients may not have requested exemp-

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**Table III.** Number of lymph nodes analyzed by type of institution.

<table>
<thead>
<tr>
<th>Type of institution</th>
<th>Less than 8 (%)</th>
<th>8 - 12 (%)</th>
<th>More than 12 (%)</th>
<th>A few (%)</th>
<th>Inflammatory magma (%)</th>
<th>No data (%)</th>
<th>Total number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP-HP</td>
<td>31 (8.7)</td>
<td>77 (21.7)</td>
<td>247 (69.6)</td>
<td>1 (0.3)</td>
<td>2 (0.6)</td>
<td>4 (1.1)</td>
<td>362</td>
</tr>
<tr>
<td>Cancer Centers</td>
<td>/</td>
<td>1 (9.1)</td>
<td>12 (90.9)</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>13</td>
</tr>
<tr>
<td>Military hospitals</td>
<td>3 (27.3)</td>
<td>3 (27.2)</td>
<td>5 (45.5)</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>11</td>
</tr>
<tr>
<td>Private hospitals</td>
<td>248 (35.0)</td>
<td>239 (33.7)</td>
<td>222 (31.3)</td>
<td>12 (1.6)</td>
<td>10 (1.3)</td>
<td>29 (3.8)</td>
<td>760</td>
</tr>
<tr>
<td>PPH</td>
<td>20 (16.4)</td>
<td>42 (34.4)</td>
<td>60 (49.2)</td>
<td>1 (0.8)</td>
<td>1 (0.8)</td>
<td>4 (3.1)</td>
<td>128</td>
</tr>
<tr>
<td>Public hospitals</td>
<td>96 (31.7)</td>
<td>93 (30.7)</td>
<td>114 (37.6)</td>
<td>6 (1.8)</td>
<td>4 (1.2)</td>
<td>13 (4.0)</td>
<td>326</td>
</tr>
<tr>
<td>Undetermined</td>
<td>1</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>/</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>399 (24.9)</td>
<td>455 (28.4)</td>
<td>660 (41.2)</td>
<td>20 (1.2)</td>
<td>17 (1.1)</td>
<td>50 (3.1)</td>
<td>1601</td>
</tr>
</tbody>
</table>
**Table IV.** – Chemotherapy administration according to cancer stage.

Réalisation de Chimiothérapie en fonction du stade de la tumeur.

<table>
<thead>
<tr>
<th>Stage</th>
<th>YES (%)</th>
<th>NO (%)</th>
<th>ne (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage I</td>
<td>9 (5.8)</td>
<td>96 (61.5)</td>
<td>51 (32.7)</td>
<td>156 (100.0)</td>
</tr>
<tr>
<td>Stage II</td>
<td>202 (37.7)</td>
<td>200 (37.4)</td>
<td>133 (24.9)</td>
<td>535 (100.0)</td>
</tr>
<tr>
<td>Stage III</td>
<td>357 (76.9)</td>
<td>50 (10.8)</td>
<td>57 (12.3)</td>
<td>464 (100.0)</td>
</tr>
<tr>
<td>Stage IV</td>
<td>240 (81.4)</td>
<td>29 (9.8)</td>
<td>26 (8.8)</td>
<td>295 (100.0)</td>
</tr>
<tr>
<td>Total</td>
<td>808 (55.6)</td>
<td>375 (25.9)</td>
<td>267 (18.5)</td>
<td>1450 (100.0)</td>
</tr>
</tbody>
</table>

a ne: data not available
b Among 1507 pathology reports studied, the tumor stage could not be determined as III or IV for 44 patients and tumor stage could not be determined at all for 13

tion. These different reasons for not having exempted status could have had an effect on the age of our study population and on tumor stage. This might explain the lower percentage (10.4%) of stage I disease at diagnosis than generally reported in the literature where the rates have been 13.3% in 1990 and 17.3% in 1995 in seven French cancer registries [6] and 19.8% for a study conducted from 1990 to 1999 in the Calvados area [3]. Our population is however comparable with earlier reports on colon cancer regarding gender (sex-ratio M/F = 1.1 in our study and in the literature) and age (mean age 68.7 ± 12.7 years in our study and 70 years in the literature) [5, 6]. The rates of inaugural complications and synchronous metastases were generally comparable with data in the literature. They remain stable [3, 6] and point out the importance of early screening, in line with the recommendations of the Cancer Plan initiated in 22 administrative districts in France including two in the Paris area involving mass screening with occult fecal blood tests [2].

The rate of proximal localizations (right + transverse colon) was higher in our study (42.9%) than reported at the consensus conference [5]. This increase could be related to a higher incidence of proximal tumors observed in recent years [12, 13].

Mean time from diagnosis to surgery or hospitalization was 20 days (excepting emergency procedures and complications). The French consensus conference did not recommend any maximal delay. The British guidelines [14] state the maximal time to care should be four weeks. We did not observe any difference in time to care by type of institution.

For 75% of patients, surgery was performed in an institution located in the administrative district of the patient’s residence. This is probably because colectomy is a well-standardized procedure performed in almost all institutions. The lower rate observed among residents of Seine-Saint-Denis suggests that care offer might be insufficient. Nearly all patients underwent surgery. The majority of operations were performed in for-profit institutions, another argument favoring the notion that well-standardized procedures are performed in institutions in the vicinity of the patient’s residence. The very low percentage of patients hospitalized in Cancer Centers despite the presence of two major referral centers in the Paris area (René Huguenin Center and Gustave Roussy Institute, but also the Curie Institute where there is a small amount of gastroenterology activity) would be explained by the fact that data were collected on first hospitalizations. Patients are generally referred to Cancer Centers after a first hospitalization in another institution. We attribute the higher percentage of operated patients observed in our study (94.4 in the Calvados area [3] and 90% in Burgundy [4]) to the greater density of specialized care centers in the Paris area and to progress in operative techniques and anesthesia.

According to the guidelines, colonoscopy with biopsy is the gold-standard examination for diagnosis. Radiographic opacification is reserved for situations where the colonoscopy cannot be properly performed (stenosis, acute obstruction). In line with the guidelines, nearly all of the patients in the study population (excluding those with obstruction or perforation) underwent complete or incomplete colonoscopy. For 10.5% of patients, complete colonoscopy was combined with a barium study for no apparent reason. It appears that a certain number of surgeons request an opacification study in order to better localize the tumor.

Routine use of CT has been developed with the advent of spiral CT and much shorter acquisition times in addition to the greater sensitivity for the detection of metastases. This would explain why 47.4% of our patients had an abdominal CT scan. It is also noteworthy that neither CT nor US were performed for a significant percentage of patients (10.1%).

According to the consensus conference, CEA assay is not recommended. For the SOR, it is optional. Both guidelines state that there is no evidence that CEA results will affect therapeutic decision making or prognosis [10]. CEA was assayed for 50% of patients, and both CEA and CA19-9 for 31.1%, comparable to the percentage in cancer registry patients (32.6%) [4].

Comparison with guidelines is difficult for CEA assay since this marker may be used for surveillance or within the framework of a therapeutic trial. There is no valid reason to order both CA19-9 and CEA which is not recommended by the consensus conference nor by the SOR.

Nodal invasion is an independent prognosis factor for cancer of the colon. According to Le Voyer et al. [15] survival rate decreases with increasing number of invaded nodes. The overall five-year survival rate for stage I or II patients is greater than 75% while for stage III patients with nodal invasion, the rate is in the 30-60% range. Furthermore, after adjustment for number of positive nodes, survival rate increases with the number of nodes examined. According to the consensus conference, it is indispensable to examine all lymph nodes present in the operative specimen and to examine at least eight nodes [5].

The Federation of French-speaking Gastrointestinal Cancer specialists (FFCD) recommends examining at least twelve nodes [16].

In our study, the number of examined nodes was less than eight for 24.9% of patients. This rate is similar to that in the Burgundy registry report where 69.2% of the pathology studies examined the recommended number of nodes [4] but is less than observed in 1990 and 1999 (55.8% and 60.2% respectively) [3, 6]. Our rate and that reported from the Burgundy registry are in line with improving practices during recent years, even though progress remains to be made. Chemotherapy is not warranted for stage I patients [5], [9]. Few stage I patients were given chemotherapy (N = 9, 5.8%) but even this small number is difficult to explain. Adjuvant chemotherapy is indicated for stage III patients [5], [9] who are known to benefit from a 10-15% improvement in cure rate [5, 17, 18] with the standard FUFOX protocol (5-fluorouracil + leucovorin). More recently, progress was noted with new protocols such as FOLFOX 4 (leucovorin + 5-fluorouracil + oxaliplatin) [18, 19].

Administration of chemotherapy for stage III patients has progressed in France in recent years with 22.3% in 1990 and 42.1% in 1995 [6]. Palliative chemotherapy is indicated for stage IV patients [5], [9] as it has improved survival rate from eight months twenty years ago to twenty months at the present time [20]. The rate of chemotherapy administration for stage IV patients increased from 41.3% in 1990-1994 to 50.2% in 1995-1999 [3].

The 1998 guidelines and the SOR are not in favor of chemotherapy outside therapeutic trials for stage II patients [5], [9].
since evidence from prospective studies has failed to demonstrate any benefit in overall survival [5]. Nevertheless, the rate of chemotherapy has progressed in France in recent years with 5.9% in 1990 and 23.9% in 1995 in the French registry studies [6]. In our study, 37.7% of stage II patients were given chemotherapy. This illustrates the divergent opinions of experts since the 1998 consensus conference [5, 19]. According to the ASCO 2004 guidelines [21], treatment of stage II patients is advocated if an insufficient number of nodes were studied, if the UICC classification is T4 [9], if there is a perforation, or if the histology is poorly differentiated. In our study, 70 of the 535 stage II patients (13.1%) fell into this category (excepting histological differentiation which was not noted).

Among these patients, 32 (15.8% of all stage II patients) had chemotherapy. These 32 patients were significantly younger than non-treated patients (64.8 versus 77.2 years P < 0.01). Multivariate analysis demonstrated that young age was the only independent factor favoring administration of chemotherapy. This is probably related to the fact that certain clinicians consider chemotherapy as an optional treatment for stage II patients and thus only propose it for younger patients since they consider not giving chemotherapy would lessen chances of cure. This attitude has been corroborated in recent studies using new protocols [18, 19]. Other clinicians consider that current evidence is insufficient to change guidelines for stage II patients [22]. In addition to the age factor, the very high rate of chemotherapy in stage II patients in our study could be interpreted as a higher rate of request for excepted status if costly chemotherapy is planned.

In conclusion, our study is the first to describe a population of patients with adenocarcinoma of the colon in the Paris metropolitan area where there is no cancer registry. It has enabled an assessment of management practices in comparison with current guidelines. These comparisons can be considered as meaningful despite the selection bias (non-exhaustive patient selection) and the high rate of missing data for certain items. Our findings are comparable with those recently reported by cancer registries in other areas of France (Côte-d'Or and Saône-et-Loire) [4]. Changes in management practices since the 1998 consensus guidelines must be taken into consideration when interpreting our results. American and French language guidelines have advocated new indications for chemotherapy (notably stage II patients) and a larger number of examined nodes (at least twelve) [16, 21]. Mass screening programs should enable initial care at less advanced stages of the disease with an expected improvement in patient survival and probably care expenditures [23].

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