

Evaluation of Colorectal Cancer Management in Eastern DR Congo. About 55 Cases Were Collected from January 2002 to December 2016 Panzi General Referral Hospital

Bafunyembaka Muka Alain, Kitumaini Munyahali John*, Ciruza Balebana Jean-Claude, Lobe Lottin Michel, Luhiriri Ndanda Levi, Kavira Isse Somo Prisca, Amisi Mangaza Emilie, Alumeti Munyali Desire, Ahuka Ona Longombe Albert

Department of Surgery, H.G.R Panzi/Université Evangéliqueen Afrique, Bukavu, DR Congo

Email: *johnkitumaini@yahoo.fr

How to cite this paper: Alain, B.M., John, K.M., Jean-Claude, C.B., Michel, L.L., Levi, L.N., Prisca, K.I.S., Emilie, A.M., Desire, A.M. and Albert, A.O.L. (2024) Evaluation of Colorectal Cancer Management in Eastern DR Congo. About 55 Cases Were Collected from January 2002 to December 2016 Panzi General Referral Hospital. *Journal of Cancer Therapy*, 15, 179-189.

<https://doi.org/10.4236/jct.2024.154016>

Received: February 5, 2024

Accepted: April 21, 2024

Published: April 24, 2024

Copyright © 2024 by author(s) and Scientific Research Publishing Inc.

This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).

<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

A retrospective study was conducted at the HGR de Panzi in eastern DR Congo to determine the profile of colorectal cancer (CRC) management based on 55 cases out of 129 digestive cancers diagnosed in the digestive surgery, endoscopy, and pathology department of the HGR de Panzi from January 2002 to December 2016. The prevalence of CRC was 42.6%. The mean age of patients was 50.8 years, with a range of 20 to 81 years. The male to female ratio was 2.2. In 69.1% of cases, the patients had a low socioeconomic status, and 52.7% had a history of hemorrhoids. Rectorrhagia revealed CCR in 49.1% of cases. The mode of discovery was predominantly emergency in 69.1% of cases, and 58.20% of CRCs were diagnosed by an initial endoscopy of the lower colon. Adenocarcinoma was found in 94.5% of cases, and 45% of cases required abdominoperineal amputation. Various postoperative complications were experienced by 54.5% of patients, and 25.5% of patients died. To decrease the occurrence of these types of cancers, it is necessary to focus on early detection in the population and enhance access to primary healthcare for everyone.

Keywords

Assessment, Management, Colorectal Cancer

1. Introduction

Colorectal cancer (CRC) is a malignant proliferation affecting the epithelial and

connective constituents of the colon and rectum [1]. It is the most common digestive cancer in both sexes and the second leading cause of cancer-related death in Western countries [2]. Although rare, it affects a high proportion of young people in Black Africa [3]. Diagnosis is often facilitated by low endoscopy, which allows for biopsy samples to be taken [4]. In the early stages, symptoms of colorectal cancer are often discreet and consist mainly of transit disorders and lower digestive hemorrhage [5] [6]. Surgical management is essential [7]. Despite the progress made in detecting and managing the disease, the prognosis remains poor, with a survival rate of no more than 50% at 5 years [8]. The risk of developing colorectal cancer before the age of 75 is 3.5% in the general population [9]. In France, it is the most common cancer in both sexes. Colorectal cancer is the most common digestive cancer, accounting for 53.8% of cases in men and 68.5% in women. The sex ratio is 1.5 [10]. The average age of onset is around 70 years, and the incidence is rare before the age of 50 (<6%) [5]. In Africa, colorectal cancers are relatively uncommon, representing only 1% - 3% of all cancers. The age of onset is young, with an average of 46 years [11]. In Burkina Faso, colorectal cancers affect a relatively young population and appear to be rare [12]. In Congo Brazza, CRC accounts for 30.2% of all digestive tract cancers [13]. In the Democratic Republic of Congo, approximately 70% of the population lives below the poverty line [14].

Unfortunately, there is no national CRC database available to understand the epidemiology of cancers in our country and manage them early. The lack of a cancer registry results in an underestimation of the incidence [15], which poses a problem for managing patients who appear to be younger than those in developed countries.

Does low socio-economic status affect the development and management of colorectal cancer in South Kivu?

This study aims to present the current state of knowledge by describing the epidemiological, diagnostic, and therapeutic features of colorectal cancers in our environment.

The specific objectives were:

- 1) To describe the characteristics of patients with colorectal cancer.
- 2) To determine the prevalence of colorectal cancer in our population.
- 3) To describe the type of colorectal cancer and the symptoms at diagnosis and the therapeutic context.
- 4) To facilitate the establishment of a cancer registry by providing some recommendations.

In this study, we aimed to identify the specificities of managing colorectal cancer in resource-limited settings and to introduce new tools for detecting its prevalence. It is important to raise awareness that colorectal cancer is not exclusively a cancer affecting older individuals.

2. Materials and Methods

This is a retrospective descriptive study based on the archives of the endoscopy

departments, pathology laboratory, operating theater, and inpatient wards of Panzi General Referral Hospital, which serves as a training hospital for general practitioners and specialists from the Evangelical University in Africa, located in the eastern part of the Democratic Republic of Congo.

This study included all cases of primary colorectal cancer that were histologically confirmed on biopsies or surgical specimens between January 2002 and December 2016.

Files without information on the histopathological nature of the digestive tract tumor or where the histopathological diagnosis had not been established were excluded.

The study analyzed epidemiological, clinical, and therapeutic variables including age, sex, socioeconomic status, profession, origin, symptoms, mode of admission, histological characteristics, topography, surgical context, surgical technique, and evolution.

The data was collected in Excel 2010 and analyzed using Epi info version 3.5.4 and JMP software to calculate the percentage frequency of each parameter and chi-square. The analysis started with a description of the data using standard descriptive statistics, including the calculation of the mean and standard deviation. Next, we conducted a bivariate analysis to identify any association between the dependent and independent variables. We used Student's T-test or the chi-squared or Fisher test if the conditions for their application were met.

The statistical significance level was set at 5% ($p < 0.05$).

The index of socio-economic position (IPSE) was utilized to estimate the socio-economic level, based on the formula:

$IPSE = age - 6 \times NF - 4 \times CP + 55$, where NF represents the level of education and CP represents the professional category. The constant 55 is added to obtain positive values [16].

The results are presented in **Table 1**.

3. Results

3.1. Prevalence of Colorectal Cancer

This study collected 55 cases of colorectal cancer from a population of 129 patients with digestive tract cancer in the surgical department of the Panzi HGR. The prevalence of colorectal cancer was 42.6%.

3.2. Epidemiological and Clinical Aspects

Male prevalence was 69.1% and sex ratio was 2.2. The mean age was 50.8 years, ranging from 20 to 81 years. The socioeconomic status was low in 69.1% of the cases, and the diagnostic delay was over 6 months in 72.7% of the cases. Unemployment was reported in 47.3% of the cases, and 61.7% of the patients came from rural areas. CRC was diagnosed due to rectal bleeding in 49.1% of the cases, and it was predominantly discovered in an emergency setting in 69.1% of the cases.

Table 1. shows the distribution of colorectal cancers by sex, age group, socioeconomic level, occupation, origin, diagnostic delay, symptoms, and mode of discovery.

Variables	N = 55	%
Gender		
Male	38	69.1
Female	17	30.9
Age group (year)		
20 - 39	15	27.3
40 - 59	21	38.2
60 - 79	18	32.7
>80	1	1.8
Living standards		
Bottom	38	69.1
Medium	17	30.9
Profession		
Unemployed (housewife and unemployed)	26	47.3
Other	16	29.1
Cultivator	12	21.8
Provenance		
	N = 47	
Rural	29	61.7
Urban	18	38.3
Diagnostic time in months		
Over 6 months	40	72.7
Less than 6 months	15	27.3
Symptoms		
Rectorrhagia	27	49.1
Digestive disorders	20	36.4
Weight loss	8	14.5
Discovery mode		
Outpatient consultation	17	30.9
In a hurry	15	27.3
Intestinal obstruction	15	27.3
Peritonitis	6	10.9
Invagination	2	3.6

3.3. Diagnostic and Therapeutic Aspects

Table 2 shows that 58.20% of the colorectal cancer (CRC) cases were diagnosed by an initial endoscopy of the lower colon.

Adenocarcinoma was present in 94.5% of cases, with 58.2% located in the rectum.

All patients underwent surgical treatment, with 5.5% receiving adjuvant chemotherapy. Of those, 45.5% underwent abdominoperineal amputation, and 54.5% experienced postoperative complications. Unfortunately, 25.5% of patients died.

Table 2. Distribution according to diagnostic circumstance, topography, histology, extension, treatment, surgical context, type of operation, morbidity, and evolution.

Variables	<i>N</i> = 55	%
Diagnostic circumstances		
Initial colonoscopy	32	58.2
Perioperative	23	41.8
Seat (Topography)		
Rectum	32	58.2
Right colon	17	30.9
Left colon	6	10.9
Histology		
Adénocarcinoma	52	94.5
Squamous cell carcinoma	3	5.5
Extension (Metastases)		
No	30	54.5
Hepatic	12	21.8
Peritoneal	9	16.4
Pulmonary	4	7.3
Treatment		
Surgery alone	52	94.5
Surgery + adjuvant	3	5.5
Type of intervention		
Abdominoperineal amputation	25	45.5
Hemi-colectomy	20	36.4
Segmental colectomy	8	14.5
Colectomy with Pull-trough	2	3.6
Morbidity		
No	25	45.5
Suppuration	19	34.5
Surgical revision	9	16.4
Sphincter and behavior disorders	2	3.6
Evolution		
improve	41	74.5
Deaths	14	25.5

3.4. Correlation between Evolution and Gender, Standard of Living, and Type of Intervention

The table indicates that 78.6% of the deaths were male. The statistical test suggests that there is no dependence between gender and the development of colorectal cancer, as the Fisher exact is 0.2959 above the significance threshold but with a relative risk of 1.6404 (Table 3).

More than three-quarters of the deaths had a low socioeconomic standard of living, but there was no correlation between socioeconomic level and colorectal cancer progression.

There was no statistically significant correlation between the type of operation and outcome, although abdominoperineal amputation was performed in 64.3% of patients who died.

Table 3. Breakdown of evolution by gender, standard of living, and type of intervention.

Evolution						
Gender	Remission	%	Deaths	%	<i>N</i> = 55	%
Male	27	71.1 (65.9)	11	28.9 (78.6)	38	69.1
Female	14	82.4 (34.1)	3	17.6 (21.4)	17	30.9
<i>N</i> = 55	41	74.5 (100)	14	25.5 (100)		100
<i>Fisher exact 0.2959</i>	<i>RR 1.6404</i>	<i>Chi-2 (Yates)</i>	<i>0.3071</i>			
Evolution						
Standard of living	Remission	%	Deaths	%	<i>N</i> = 55	%
Botton	27	71.1 (65.9)	11	28.9 (78.6)	38	69.1
Medium	14	82.4 (34.1)	3	17.6 (21.4)	17	30.9
<i>N</i> = 55	41	74.5 (100)	14	25.5 (100)		100
<i>Fisher exact 0.2959</i>	<i>RR 1.6404</i>	<i>Chi-2 (Yates)</i>	<i>0.3071</i>			
Evolution						
Type of intervention	Remission	%	Deaths	%	<i>N</i> = 55	%
Abdominoperineal amputation	16	64.0 (39.0)	9	36.0 (64.3)	25	45.5
Hemi-colectomy	17	85.0 (41.5)	3	15.0 (21.4)	20	36.4
Segmental colectomy	6	75.0 (14.6)	2	25.0 (14.3)	0	14.5
Colectomy with Pull-trough	2	100 (4.9)	0	0.0 (0.0)	2	3.6
<i>N</i> = 55	41	74.5 (100)	14	25.5 (100)	55	100
<i>Chi-square 3.3010</i>	<i>dl 3</i>	<i>Probability</i>	<i>0.3475</i>			

4. Discussion

In this study, colorectal cancer accounted for 42.6% of all digestive tract cancers, ranking second after gastric cancer. These results are consistent with those of Chbani L *et al.*, who reported a high frequency of colorectal cancers at 41.43% of all digestive tract cancers, followed by gastric cancers at 29.64% [17]. In a retrospective study from 1992 to 2009, Salamatou MG *et al.* found that the prevalence of colorectal cancer in Niger was 28.80%, which ranked second after gastric cancer [18].

The study also revealed a male predominance of 69.1% with a sex ratio of 2.2. These findings are consistent with those of Peko *et al.* [13], who reported a male/female sex ratio of 1.5. In a study by Tebibel Soraya *et al.* [19], males accounted for 66.36% of the cases, with a sex ratio of 1.9, which is similar to the present study. This male predominance in our environment may be due to greater male exposure to risk factors such as alcohol, tobacco, and a low-fiber diet (barbecues).

Colorectal cancer was found to occur at a younger age than reported in the literature. The mean age at diagnosis in this study was 50.8 years with a standard deviation of ± 16.4 years and extremes of 20 and 81 years. This is significantly lower than the mean age of 65 - 75 years reported in Western literature [20]. The occurrence of colorectal cancers at a young age in our series may be attributed to a hereditary aspect, possibly through consanguinity.

- The life expectancy of Africans, including Congolese, is significantly lower than that of European populations.

- Over half of Africa's population, including the DRC, is young, with a large proportion under the age of 50.

In a retrospective study conducted by Tebra *et al.* in Tunisia, 165 cases of rectal cancer were collected and treated at the radiotherapy department of CHU Sousse between 1995 and 2004. The mean age at diagnosis was 56 years, with a range of 26 to 86 years [21].

In this series, patients under the age of 40 accounted for 27.3% of all colorectal cancer patients. In Western countries, such as the United States, colorectal cancer in young people accounts for only 1% to 4% of all cases [22]. Colorectal cancer is more prevalent in young people in Middle Eastern countries, with rates of In Türkiye, the percentage is 18% [23], while in Egypt it is 38%. In Egypt, the high incidence of colorectal cancer in young people is mainly attributed to the natural distribution of the age pyramid, as only 5.70% of the population is over 60 years old [24]. Additionally, a study of 165 cases of rectal cancer in central Tunisia by Tebra *et al.* showed that 70% of patients had an average socioeconomic level [21]. Disadvantaged patients have a higher frequency of emergency admissions for complicated colorectal cancer compared to non-disadvantaged patients (56% vs 35%, odd ratio: 2.29) [25]. The study found that the unemployed and housewives were the most represented at 47.3%, which may be related to their higher representation in the general population. Additionally, socioeconomic and educational levels are generally low among disadvantaged patients, leading them to resort to traditional treatments and self-medication.

In a study on the epidemiology of digestive cancers in hospitals in Bamako, Diarra *et al.* [26] found that housewives and farmers were the most represented social strata, accounting for 34.8% and 33% respectively. These results are partially consistent with those of Diarra *et al.* [26]. The study also revealed that 61.7% of patients came from rural areas. Similarly, Hama *et al.*'s study in Niger showed that half of the patients came from disadvantaged backgrounds [6]. In 72.7% of cases, the delay between the appearance of the first sign and the histological diagnosis was over 6 months. The mean delay was 9.9 months, with extremes ranging from 1 to 23 months and a standard deviation of 5.3. This delay is likely linked to poverty, as this cancer is more prevalent among underprivileged social classes who accumulate risk factors. In Africa, and specifically in DR Congo, diagnosis is often made at an advanced stage of the disease.

Tebra *et al.* reported an average consultation time of 8 months [21], which is consistent with this series. In the study by Pocard M *et al.*, the average consultation time was less than or equal to 6 months in 73% of cases, with an average of 4.7 months (range: 0 - 20 months) [27]. The most common symptom of colorectal cancer was rectal discharge (49.1%). In a study conducted by Casanelli *et al.* at Treichville University Hospital in Côte d'Ivoire, which focused on the epidemiological, clinical, and therapeutic aspects of 16 cases, rectorrhagia was the dominant clinical symptom in 43.75% of cases [28]. This percentage is slightly lower than the findings of the current study. In contrast, Tebra *et al.* found that rectorrhagia was the dominant symptom in 82.0% of cases [21], which is signifi-

cantly higher than the current study.

Colorectal cancer was discovered through emergency means in 69.1% of cases, with intestinal obstruction being the mode of discovery in 27.3% of cases. These findings are consistent with those of Laforest A *et al.*, who reported that left colonic tumors are revealed through intestinal obstruction in nearly 20% of cases [29]. According to Casanelli *et al.* (28), bowel obstruction was a mode of discovery of colorectal cancer in 6.25% of cases. All patients underwent an endoscopic examination, with 58.2% of cases confirmed during the initial endoscopy and 41.8% discovered intraoperatively.

In this study, 58.2% of the cancers were in the rectum. A study by Sawadogo *et al.* in Burkina Faso showed that rectal localization of colorectal cancer was predominant at 58.8%, which is consistent with this study.

Adenocarcinoma was the most frequent histological type, accounting for 94.5% of cases. The proportion of cases with adenocarcinoma is consistent with previous literature, which estimates it to be between 95% and 97% [30]. Soraya T *et al.* found a similar figure of 94.54% [19]. In Tebra *et al.*'s series, adenocarcinoma was found in 96.40% of cases [21].

Abdominal ultrasounds and chest X-rays were performed in all cases, revealing peritoneal adenopathy in 16.4% of ultrasounds, liver metastases in 21.8% of ultrasounds, and lung metastases in 7.3% of chest X-rays.

In the study conducted by Tebra *et al.*, abdominal ultrasound was performed in 97.5% of cases and chest radiography was performed in 100% of cases. The study also found that at the time of diagnosis, 45.5% of colorectal cancer patients had synchronous metastases, which is consistent with previous literature reporting that nearly half of patients develop metastases [31]. Of those cases, 5.5% were found to be immediately metastatic [21]. Additionally, Casanelli *et al.* reported that pulmonary metastases were found in 6.25% of cases [28]. All patients in this series underwent surgery, with only 5.5% receiving adjuvant chemotherapy. A study conducted by Hama Y *et al.* in Niger on Rectal cancer and poverty: a medical divide, showed that 11.1% of patients underwent adjuvant chemotherapy alone [6]. The first surgical technique used was abdominoperineal amputation, which accounted for 45.5% of cases. It was indicated for curative purposes in most cases of cancer of the lower and middle rectum. In the Tunisian series by Tebra *et al.* [21], colorectal cancer represented 41.30% of cases. Among these patients, 54.5% experienced various postoperative complications and 25.5% died. Cossa and Club Coelio conducted a study on laparoscopic colorectal resection in elderly patients, which included 144 participants. The study found a morbidity rate of 29% and a mortality rate of 6%. These rates were significantly higher in patients with cancerous or psychiatric pathology or those living in long-stay facilities [32]. On average, 43 deaths from colorectal cancer per 100 new cases are recorded in Poitou-Charentes every year, with 55% of those being male [33].

In this series, 78.6% of deaths were male. In Bouffard B *et al.*'s study on colorectal cancer incidence and mortality in Poitou-Charentes, 55% of deaths were male [33].

In this series, 64.3% of patients who died underwent abdominoperineal amputation. The Norwegian Cancer Registry reports a 30% increased risk of death in patients treated with abdominoperineal amputation compared to those treated with prior resection [34]. This difference may be due to late consultations and the context of operability, which was dominated by extreme urgency.

5. Conclusion

Colorectal cancer is a prevalent disease in our environment, affecting both genders but with a higher incidence in males. It is often detected through lower gastrointestinal bleeding and is usually accompanied by complications. Unfortunately, diagnosis is often delayed. The only available treatment option in our environment is surgical removal of the tumor. To enhance the management of colorectal cancers, it would be beneficial to implement early detection of cancers in the population through the primary healthcare system. This would enable the creation of a registry of cancers and their incidence in our region.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] Lambert, R. (2009) Épidémiologie du cancer colorectal. *Cancero Digest*, **1**, 2-6.
- [2] Toumi, A.A., Mahmoud, L.K., Khiari, M., Lahmer, A., Gharbi, L., Dhraïef, M., *et al.* (2010) Étude épidémiologique, anatomopathologique et évaluation des facteurs pronostiques des adénocarcinomes colorectaux. *La Tunisie Médicale*, **88**, 12-17.
- [3] Lazorthes, F. (1998) Cancer du rectum: Épidémiologie, anatomie pathologique, diagnostic, évolution, principes du traitement et prévention. *La Revue du Praticien*, **48**, 2151-2155.
- [4] Ridereau-Zins, C. (2014) Imagerie du cancer colique. *Journal de Radiologie Diagnostique et Interventionnelle*, **95**, 477-485.
<https://doi.org/10.1016/j.jradio.2014.02.005>
- [5] Rougier, P., Clavero-Fabri, M.C. and Mitry, E. (1999) Cancer du côlon: Épidémiologie, anatomie pathologique, stades de Dukes, physiopathologie, diagnostic, évolution, principes du traitement et prévention. *La Revue du Praticien*, **49**, 789-793.
- [6] Hama, Y., Rabiou, S., Efaref, B., Sani, R., Harouna, Y.D. and Nouhou, H. (2017) Cancer du rectum et pauvreté: Une fracture médicale! *Journal Africain d'Hépatogastroentérologie*, **11**, 164-167.
<https://doi.org/10.1007/s12157-017-0737-1>
- [7] Aparicio, T., Mitry, E., Cunha, A.S. and Girard, L. (2005) Prise en charge des cancers colorectaux des sujets âgés. *Gastroentérologie Clinique et Biologique*, **29**, 1014-1023. [https://doi.org/10.1016/S0399-8320\(05\)88176-X](https://doi.org/10.1016/S0399-8320(05)88176-X)
- [8] Mesli, S.N., egagba, D., Tidjane, A., Benkalfat, M. and Abi-Aad, C. (2016) Analyse des facteurs histo-pronostiques du cancer du rectum non métastatique dans une série ouest Algérienne de 58 cas au CHU-Tlemcen. *Pan African Medical Journal*, **24**, Article 5. <https://doi.org/10.11604/pamj.2016.24.5.8580>
- [9] Polus, M., Montrieux, C., Giet, D., Louis, E., Belaiche, J. and Coche, E. (2009) Le

- dépistage généralisé du cancer colorectal : Une absolue nécessité et une réalité imminente en Communauté française. *Revue Médicale de Liège*, **64**, 96-102.
- [10] Bouvier, A.M. (2009) Épidémiologie descriptive du cancer colorectal en France. Réseau des Registres.
- [11] Ndiaye, A., Diallo, F., Samba, A., Sanni, S., Cisse, F., Doupa, D., *et al.* (2016) Descriptive Analytical Study of 41 Colorectal Cancer Cases Operated in Senegal. *International Research Journals*, **6**, 7-10.
- [12] Sawadogo, A., Ilboudo, P.D., Durand, G., Peghini, M., Branquet, D., Sawadogo, A.B., *et al.* (2000) Epidémiologie des cancers du tube digestif au Burkina faso. *Médecine d'Afrique Noire*, **47**, 342-345.
- [13] Peko, J.F., Ibara, J.R., Dangou, J.M. and Gombembalawa, C. (2004) Profil histo-épidémiologique de 375 cancers digestifs primitifs au CHU de Brazzaville. *Médecine Tropicale. Revue du Corps de Santé Colonial*, **64**, 168-170.
- [14] Programme Alimentaire Mondial and Institut National des Statistiques (2008) Analyse globale de la sécurité alimentaire et de la vulnérabilité Juillet 2007 et Fevrier 2008 RDCongo.
- [15] Tshimpi, A., Ndarabu, T., Batumona, B., Tambwe, F. and Kayembe, J.M.N. (2016) Cancer en République Démocratique du Congo en 2016. *Annales Africaines de Médecine*, **9**, 2331-2332.
- [16] Genoud, P.A. (2011) Indice de position socioéconomique (IPSE): Un calcul simplifié. Université de Fribourg, Fribourg, 1-9.
- [17] Chbani, L., Hafid, I., Berraho, M., Mesbahi, O., Mesbahi, O. and Nejari, C. (2010) Aspects épidémiologiques et anatomopathologiques des cancers dans la région de Fès-Boulemane (Maroc). *Eastern Mediterranean Health Journal*, **19**, 263-270.
- [18] Salamatou, M.G., Hinde, H., Abdelmadjid, S. and Ali, Q. (2014) Les cancers digestifs au Niger: Fréquence relative sur une étude rétrospective de 1992 à 2009. *European Scientific Journal*, **10**, 339-349.
- [19] Soraya, T., Youcef, Z., Salah, A., Chahinez, M., Sabir, M. and Samy, K. (2014) Colorectal Cancer: Epidemiological Study, Clinical, Pathological and Immunohistochemical Examination in Patients of Eastern Algeria. *International Journal of Pharmaceutical Sciences Review and Research*, **26**, 13-18.
- [20] Boutron Ruault, M.C. and Laurant Puig, P. (2005) Épidémiologie, cancérogénèse, facteurs de risque, prévention et dépistage du cancer colorectal. In: Rambaud, J.-C., Ed., *Traité de Gastroentérologie*, Flammarion, Paris, 538-550.
- [21] Tebra, M.S., Harrabib, I., Belajouzaa, S., Chaouachea, K. and Bouaouinaa, N. (2006) Le cancer du rectum dans le centre de la Tunisie: A propos de 165 cas. *Cancer Radiotherapie*, **10**, 516. <https://doi.org/10.1016/j.canrad.2006.09.065>
- [22] Selves, J. and Olschwang, S. (2009) Étude des cancers coliques du sujet jeune. *Medicine/Sciences*, **25**, 25-28. <https://doi.org/10.1051/medsci/2009251s25>
- [23] Alici, S., Aykan, N.F., Sakar, B., Bulutlar, G., Kaytan, E. and Topuz, E. (2003) Colorectal Cancer in Young Patients: Characteristics and Outcome. *The Tohoku Journal of Experimental Medicine*, **199**, 85-93. <https://doi.org/10.1620/tjem.199.85>
- [24] Abou-Zeid, A.A., Khafagy, W., Marzouk, D.M., Alaa, A., Mostafa, I. and Ela, M.A. (2002) Colorectal Cancer in Egypt. *Diseases of the Colon & Rectum*, **45**, 1255-1260. <https://doi.org/10.1007/s10350-004-6401-z>
- [25] Pollock, A.M. and Vickers, N. (1998) Deprivation and Emergency Admissions for Cancers of Colorectum, Lung, and Breast in Southeast England: An Ecological Study. *BMJ*, **317**, 245-252. <https://doi.org/10.1136/bmj.317.7153.245>

- [26] Diarra, M., Konate, A., Traoré, C.B., Souchko-Kaya, A., Diarra, C.A., Doumbia-Samaké, K., *et al.* (2012) Epidémiologie des cancers digestifs en milieu hospitalier à Bamako. *HEGEL: HEpato-GastroEntérologie Libérale*, **2**, 12-22.
<https://doi.org/10.3917/heg.021.0012>
- [27] Pocard, M., Gallot, D., Derycke, Y. and Malafosse, M. (1997) Adénocarcinome colorectal chez le sujet de moins de 40 ans. *Gastroentérologie Clinique et Biologique*, **21**, 955.
- [28] Casanelli, J.M., Blegole, C., Moussa, B., N'Dri, J., Aboua, G., Yamossou, F., *et al.* (2005) Cancer du rectum : Aspects épidémiologiques, cliniques et thérapeutiques à propos de 16 cas au CHU de Treichville. *Mali Medical*, **20**, 21-23.
- [29] Laforest, A. and Lefèvre, J.-H. (2014) Cancer colique gauche en occlusion : En faveur d'une chirurgie première. *Côlon & Rectum*, **8**, 54-60.
<https://doi.org/10.1007/s11725-014-0507-1>
- [30] Lelong, B., Moutardier, V. and Delpero, J.R. (2004) Prise en charge des tumeurs primitives colorectales. *Revue du Praticien*, **54**, 155-166.
- [31] Guimbaud, R. (2004) Colorectal Cancers: Management of Metastatic Cancers. *Revue du Praticien*, **54**, 167-176.
- [32] Cossa, J.P. and Coelio, L.C. (2008) Résection colorectale sous coelioscopie chez le patient âgé : Étude prospective multicentrique de 144 patients. *e-mémoires de l'Académie Nationale de Chirurgie*, **7**, 69-75.
- [33] Bouffard, B., Debarre, J., Defossez, G., Giraud, J. and Ingrand, P. (2012) Le cancer colorectal: Incidence et mortalité des cancers en Poitou-Charentes. *Registre des Cancers Poitou-Charentes, Poitou-Charentes*.
- [34] Marr, R., Birbeck, K., Garvican, J., Kacklin, C.P., Tiffin, N.J., Parsons, W.J., *et al.* (2005) The Modern Abdominoperineal Excision: The Next Challenge after Total Mesorectal Excision. *Annals of Surgery*, **242**, 74-82.
<https://doi.org/10.1097/01.sla.0000167926.60908.15>