Annales Africaines de Médecine
Article original

Histopathological profile of small bowel cancers in the City of Kinshasa, Democratic Republic of the Congo, from March 2011 to March 2023

Profil histopathologique des cancers de l'intestin grêle dans la ville de Kinshasa, République démocratique du congo, de mars 2011 à mars 2023

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Résumé

Contexte et objectifs. Le cancer de l'intestin grêle est très peu documenté. L'objectif du présent travail était de décrire le profil épidémiologique et histopathologique des cancers de l'intestin grêle dans la ville de Kinshasa.

Méthodes. C'était une étude descriptive d'une série des cas colligés dans quatre laboratoires d'Anatomie Pathologique de la ville de Kinshasa et sur une période de 12 ans. Les patients ayant comme diagnostic histologique des cancers de l'intestin grêle ont été répertoriés de manière exhaustive à partir des registres des laboratoires sélectionnés. Les pièces biopsiques archivées ont été relues.

Résultats. Sur 812 cancers digestifs enregistrés durant la période d'étude, 43 avaient le cancer de l'intestin grêle soit une fréquence relative de 3,5 %. Le sexe masculin prépondérant (58,1 %). Les ¾ de nos patients avaient un âge compris entre 6 ans et 58 ans. Les patients plus âgés avaient un grade histologique plus élevé. La quasi-totalité de cancers de l'intestin grêle était déjà invasifs au moment du diagnostic et l'adenocarcinome était le cancer le plus fréquent. Le type histologique influençait significativement le grade (p= 0.007).

Conclusion. Le cancer de l'intestin grêle dont le type le plus courant est l'adenocarcinome était invasif et rendant ainsi le pronostic plus défavorable. Ceci montre qu'il y a un problème de retard diagnostic. L'âge et le type histologique exerçaient une influence sur le niveau d'invasion des cancers de l'intestin grêle.

Mots-clés : Adenocarcinome, cancer, intestin

Summary

Context and objective. Cancer of the small intestine is poorly documented. The aim of this study was to describe the histopathological profile of small bowel cancers in the City of Kinshasa.

*Methods.*This was a descriptive study of a series of cases collected in four Pathological Anatomy laboratories in the city of Kinshasa over a 12-year period. Records of patients with histological diagnoses of small bowel cancers were exhaustively collected from the registries of the selected laboratories.

Results

Out of 812 digestive tract cancers recorded in studied period, 43 had cancers of the small intestine, with a relative frequency of 3.5 %. Male gender predominated (58.1 %). The ¾ of patients with small bowel cancers were between 6 and 58 years old. Older patients had a higher histological grade. Histological type had a significant influence on cancer grade (p= 0.0072).

Conclusion. Almost all small bowel cancers were diagnosed at the invasion's stage, making the prognosis poorer. The high number of invasive cancers suggests that the delayed diagnosis of cancers could be the culprit in Kinshasa.

Keywords: adenocarcinoma, cancer, smal intestine, histopathological profile

https://dx.doi.org/10.4314/aamed.v17i2.4

Received: October 9th, 2023
Accepted: February 8th, 2024

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grêle, profil histopathologique

https://dx.doi.org/10.4314/aamed.v17i2.4
Reçu le 9 octobre 2023
Accepté le 8 février 2024

Introduction

Cancer of the small intestine is a major public health problem (1-2), and few studies have focused on the subject (2-4). Recent studies show an upward trend in small bowel cancer worldwide, particularly in America and the West (3,5). Cancers of the small intestine present a certain number's risk factors, including inflammatory diseases of the small intestine, familial adenomatous polyposis, Peutz-Jeghers syndrome, celiac disease, peptic ulcers and numerous dietary and environmental factors (,8,11-12). Studies show that small bowel cancers are more common in the black population (14). There are 4 histological types of small bowel cancer: adenocarcinoma, neuroendocrine carcinoma, lymphoma and sarcoma (4). Small bowel adenocarcinoma is histologically similar to colonic adenocarcinoma, and the prognosis of small bowel cancers is poor, with a 5-year survival rate of less than 30 % (1,15-16).

African studies are very rare, and in the Democratic Republic of Congo, there are no data on small bowel cancers. The frequency of this pathology is unknowned, the level of invasion and the possible associated factors are unclear in our country whereas worldwide data show an increasing trend and worse prognosis. Prevention's methods are not clearly established. The aim of this study is to determine the histopathological profile of small bowel cancers in the city of Kinshasa, with a view to establishing the frequency, histological type, level of invasion and any associated factors. In order to have true scientific data which help us to better guide management and policy in the fight against small bowel cancers in Kinshasa city or the Democratic Republic of the Congo (DRC).

Methods

Nature, site and study period

Our study took place in the city of Kinshasa, the capital of the DRC. Kinshasa City is one of the 26 provinces of the DRC. Administratively, it is made up of 4 districts and 24 townships. In terms of health, the city of Kinshasa contains 35 health zones. The surface area of the city of Kinshasa is 9965 km2. Kinshasa's population is estimated at around 16,316,000 in 2023, with a density of 1,700 inhabitants/km. It is bounded to the north and west by the Congo River, forming a natural border with the Republic of Congo Brazzaville, to the south by the province of Central Kongo and to the east by the province of Kwango, Kwilu and Maï ndombe (22). Small bowel cancer diagnosis is only carried out in hospitals and specialized laboratories, and we have selected a total of 4 sites, including 2 specialized laboratories: INRB and LEBOMA Laboratory, and 2 hospitals (Kinshasa University hospital, KUH and Monkole Hospital). These 4 sites receive around 90% of the samples from the city of Kinshasa.

This is a descriptive study of a series of cases collected in four pathological anatomy laboratories in the city of Kinshasa (KHU, INRB, Leboma Laboratory and Monkole hospital center) in the DRC.

The present study covered a 12-years period from March /1st/ 2011 to March/ 1st/ 2023.

Sampling

We have collected a total of 58 cases of small bowel cancer. Only 43 cases met our inclusion criteria. *Selections criteria*

We included all cases of small bowel cancer for which slides and/or blocks were found, and all cases in which the diagnosis was confirmed by the third reader in the case of diagnostic discordance on the first two. Cases not included are those where slides and/or blocks were not found, cases where the material was insufficient for a reliable histological diagnosis and cases where discordance persisted at the third pathologist reading.

Parameters of interest

Ours parameters of interest were: invasion of the small bowel cancer, histology type, differentiation and associated factors.

Operational definition

In the present study we considered a well-differentiated or grade 1 adenocarcinoma when we have glandular formation > 95% of the fields examined. Moderately differentiated or grade 2 between 50% and 95% glandular formation and poorly differentiated or grade 3 < 50 % glandular formation. Adenocarcinoma was said to be mucinous when there was 50% of mucus. We

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considered a signet-ring cell adenocarcinoma when there were more than 50% signet-ring cells.
A cancer was considered invasive when tumor cells infiltrated the submucosa or muscularis.

Histopathology diagnosis

Slides were read using a Leica ICC50W optical microscope with camera and monitor. The selection of laboratories was non-probabilistic, and patients with histological diagnoses of small bowel cancer were exhaustively listed from the registers of the selected laboratories. The histological sections of the selected samples were subjected to a second reading by Pathologists, and in some cases a third reading was carried out for definitive histological confirmation

Statistical analysis

The database was entered into an Excel softwarde and then transferred to R software version 4.2.0 for statistical analysis. Univaried analysis was used to determine mean age, median age, first quartile, third quartile and extreme ages of our patients. The frequency of small bowell cancer, the histological type and sub type. The Pearson chi-square test was used to assess the influence of patient age on the level of invasion of small bowel cancer and the influence of histological type on invasion.

Ethical considerations

As the study was primarily concerned with archival material, not people, informed consent was not required. In all cases, the rules of anonymity, confidentiality and data protection were respected.

Results

The present study recorded 43 patients with cancers of the small intestine out of 812 patients diagnosed with cancers of the digestive tract with a relative frequency of 3.5 %.

Histological type frequency of small bowel cancers

The histological type frequency of small bowel cancers is illustrated in the figure 1 below.

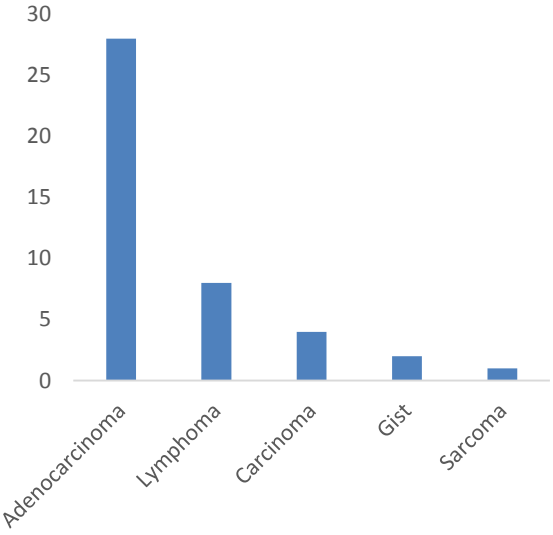

Figure 1. Distribution of small bowel cancers by histological type

Adenocarcinoma was the most common histological type in our research, followed by lymphoma and carcinoma.

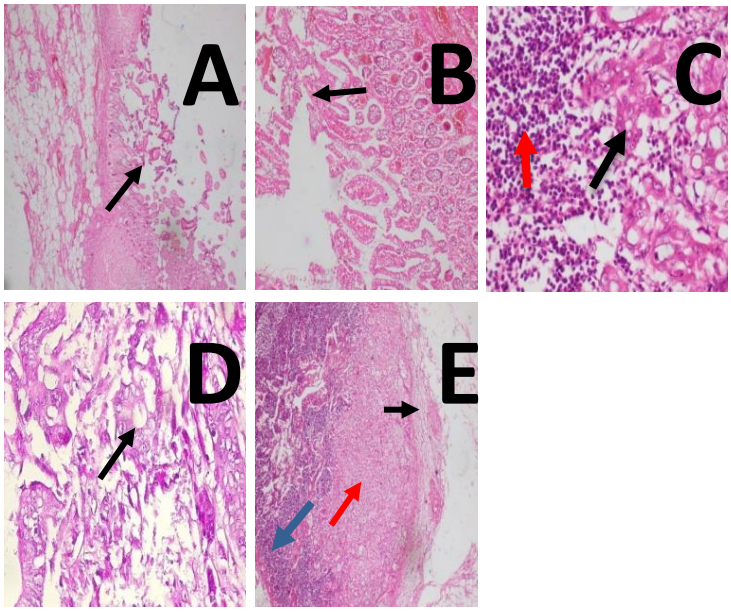

Figure 2. A and B: Wall of small bowell, showing graft mucosa with surface and crypt epithelium free of cytonuclear atypia (HE, X100). C and D: Illustrate a well-differentiated infiltrating adenocarcinoma of the grafted intestine, visualizing a colonic mucosa whose surface and crypt epithelium is made up of atypical cells building tubuliform, Tils structures (red arrow (HE, X400); E: Lymph node invasion, showing the capsule (black arrow) and the lymph node parenchyma relic (blue arrow) and the area invaded by tumour cells (red arrow) (HE, X100).

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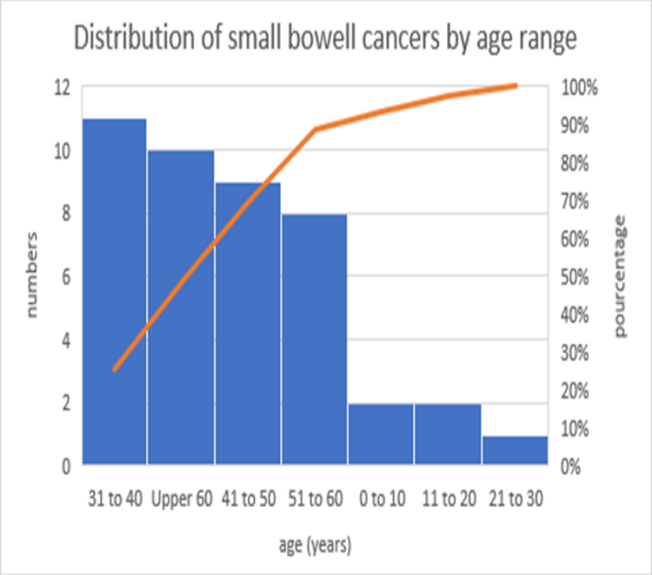

Figure 3. Distribution of small bowel cancers by age group.

Our study illustrates that small bowel cancer is most prevalent in patients ranging in age from 31 to over 60.

Table 1: Distribution of small bowel cancers by histological type, tissue origin and sampling method

Histology type	Total	(%)	Tissular origine	Total	(%)	Chirurgical type Speciman	Total	(%)
Adenocarcinoma	28	65,1	Primary tumor	39	90,7	Biopsy	13	30,2
Carcinoma	4	9,3				Chirurgical speciman	30	69,8
GIST	2	4,6	Secondary tumor	4	9,3			
Lymphoma	8	18,6						
Sarcoma	1	2,3						

Adenocarcinoma was the most common histological type in 28 patients (65.1 %), most small bowel cancers were well-differentiated in 39 patients (90.7 %), and we recorded more surgical specimens in 30 patients (69.8 %).

Table 2: Frequency of small bowel cancer histological subtypes
The table below shows the distribution of the different histological subtypes of small bowel cancer

Histology sub type	Total	(%)
Lieberkhunien adenocarcinoma	9	21
Mucinous adenocarcinoma	4	9
Diffuse large B cell lymphoma	3	6,9
Neuroendocrine carcinoma	3	6,9
Gastrointestinal Stromal tumor	2	4,6
Malt Lymphoma	1	2,3
Micropapillary adenocarcinoma	1	2,3
Burkitt Lymphoma	1	2,3
Small cell Lymphoma	1	2,3

Lieberkhunian adenocarcinoma was the most frequent histological subtype (21%), followed by mucinous adenocarcinoma (9 %). Diffuse large B-cell lymphoma and neuroendocrine carcinoma ranked third (6.9 %).

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Table 3: Distribution of small bowel cancers according to histological grade and presence of infiltration

Histology grade	Total	(%)	Infiltration's degree	Total	(%)
Grade 1	34	79	Invasive	42	97,6
Grade 2	5	11,6	In situ	1	2,3
Grade 3	2	4,6			

Most small bowel cancers were grade 1, with 79%, and were diagnosed at the invasive stage, with 91.1%.
The distribution of small bowel cancers is illustrated in figure 4.

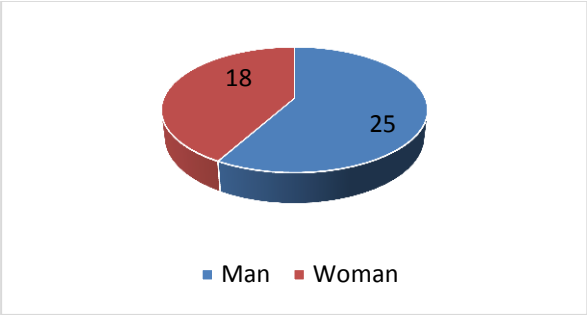

Figure 4. Distribution of small bowel cancers by gender
Of 43 patients with small bowel cancers 25 were men or 58.1 % and 18 women or 41.9 % with a sex ratio men/women 1.4/1.
In our study, the minimum age of patients with small bowel cancers was 6 years old, and the oldest patient was 83 years old. The mean age was 46.5 years old and the median 49 years old.
The ¾ of patients with small bowel cancers were between 6 and 58 years old.
The mean age in the male group was 44.6 years old, and in the female group 49.1 years old. The difference in mean age between men and women was not significant p value = 0.36 at the threshold of 0.05.
In our research, we found that age was an influence in the invasion's degree of small bowel cancers at the highly significant pvalue of 0.00027, at the threshold of 0.05. Older patients had a higher histological grade. The histological type had an influence on the grade with a highly significant p value of 0.0072 at the threshold of 0.05.

Discussion

Our research showed that small bowel cancer represented 3.5 % of all malignant primitive and metastatic tumor of the digestive tract. This is similar to many studies such as Adam Barsouk's in the USA (United State of America), which found a frequency of less than 5 %. This similarity is justified by the fact that cancer of the small bowel is rare. The mean age at diagnosis was 46.5 years. This differs from Ouedraogo's study in Burkinafaso, which found a mean age of 34.3. The difference in mean age can be explained by the fact that our study covered both primary and secondary cancers, whereas Ouedraogo's study covered only primary cancers of the small bowel (17). We found that more men (58 %) were affected by cancers of the small bowel. Our results are similar to those of Bouthaina Dabaja from Japan (18). The most common histological type was adenocarcinoma (65 %), followed by lymphoma (18.6 %). Our study is identical with several studies, notably that of Ouedraogo from Burkinafaso, Adam from the USA and Fabio Gelsomino, who found adenocarcinoma in the first place, with a frequency of 35.2% and 40% respectively for the latter two authors (10,17). It was followed by neuroendocrine tumor. The difference in histological type in the second position would be justified by the fact that our research focused only on neuroendocrine carcinoma, whereas both researchers had studied on malignant and non-malignant neuroendocrine tumours. This research shows that 90.7 % of patients had primitive small bowel cancer wich originated from the matrix tissue and 97.6 % of small bowel cancers were invasive at diagnosis.
Our study found that age was an influence in the degree of invasion and the differenciation of small bowel cancers. The histological type had an influence on grade cancer. We didn't found study which established the influence of age patient with invasion, differenciation and histological type in the literature. The absence of a study in the Democratic Republic of Congo could be justified by the rarity of this pathology. Several studies show that modifiable risk factors such as dietary habits and smoking could reverse the progression of these cancers (19-21).

Strengths and weakness of the study

The added value of our study is to show the extent of small bowel cancer in Kinshasa and all most was invasive and increasing with the age. It constitutes a real indicator for possible public health action and governance policies in the fight against cancers of the small bowel in the city of

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Kinshasa, and indeed throughout the national territory of the DRC.

The associated factors with small bowel cancer in the city of Kinshasa was a finding.

Our research has the merit of being one of the rare studies to have determined the histopathological aspects of small bowel cancer in several hospitals in the city of Kinshasa over a long period.

Limitations of the study

Our research is limited by the fact that we did not address the molecular aspects of small bowel cancers. The lack of certain information on the histopathology request form also limited other epidemiological analysis.

Conclusion

Cancers of the small bowel are uncommon, and there have been no large-scale, long-term studies of this pathology in the city of Kinshasa, or indeed in the Democratic Republic of Congo. However, worldwide estimates show an increasing trend in small bowel cancers, and what's more, this is a cancer with a bad prognosis. In our case series, adenocarcinoma was the most common histological type, and the majority were diagnosed at the invasive stage. The older patient had more small bowel cancer to the invasive stage. We found more primary tumors of the small intestine than metastatic tumors.

Age had an influence on the degree of invasion and differentiation of small bowel cancers. histological type was influenced by histological grade. we suggest that the population be made aware of this type of cancer, although rare, and that molecular studies be carried out on Congolese patients with small bowel cancers for personalized management according to the molecular signature of each patient. the implementation of early detection methods will reduce the cases's number of invasive small bowel cancer.

Declaration of competing interest

The authors declare that they have no competing interest.

Author's contribution

Pezo diwulu: conception, data collection, data analysis and writing of the article.

Kingebeni and Mbatu: participation in data analysis,

Kisile Mikuo and Lebwaze Massamba bienvenu: Review of his main intellectual content and approval of the version to be published.

The other authors: participation in the debate for the approval of the version to be published.

All the authors reviewed the final version of the manuscript and gave their consent.

Acknowledgments

Our thanks go to the Professors, Medical Doctors and to the laboratory technicians of the Anatomy Pathology Department of the University Clinic of Kinshasa who all played a significant role in the achievement of this scientific research.

References

1. De Back T, Nijskens I, Schafrat P, Chalabi M, Kazemier G, Vermeulen L, *et al*. Evaluation of Systemic Treatments of Small Intestinal Adenocarcinomas: A Systematic Review and Meta-analysis. *JAMA Netw Open*. 2023; **6**:230-631.
2. Pan SY and Morrison H. Epidemiology of cancer of the small intestine. *World J Gastrointest Oncol*. 2011; **3:33**‑ 42.
3. Siegel RL, Miller KD, Jemal A. Cancer statistics. *CA Cancer J Clin*. 2020; **70:7**‑ 30.
4. Barsouk A, Rawla P, Thandra KC and Barsouk AD. Epidemiology of Cancers of the Small Intestine: Trends, Risk Factors, and Prevention. *Med Sci (Basel)*. 2019; **7**:46-55.
5. Sakae H, Kanzaki H, Nasu J, Hakimoto J, Matsuedaka K, Yoshueka M *et al.* The characteristics and outcomes of small bowel adenocarcinoma: a multicentre retrospective observational study, *British journal of cancer*; 2017, **117**:1607-1613.
6. Hatzaras, Palesty F, Abir F, SulivanP, Kozol, Dudrick S J *et al.* Small-bowel tumors: epidemiologic and clinical characteristics of 1260 cases from the connecticut tumor registry, *Archiv of surgey*. 2007;**142**:229-235.
7. Kacmaz E, Sarasqueta A, van Eeden S, Dreijerink KM, Klümpen HJ, Tanis PJ, *et al.* Update on Incidence, Prevalence, Treatment and Survival of Patients with Small Bowel Neuroendocrine Neoplasms in the Netherlands, *World Journal of Surgery*. 2021 **45** 2482-2491.
8. Alshamsan B, Aseafan M, Badran A, Shaheen A, Elshenawy MA, Bazarbashi S, et al. Characteristics and outcomes of small bowel adenocarcinoma: 14 years of experience at a single tertiary hospital in Saudi Arabia. *Mol Clin Oncol*. 2023; **18**:17.
9. Pandya K, Overman MJ and Gulhati P. Molecular Landscape of Small Bowel

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Adenocarcinoma. *Cancers Basel*. 2022; **14**:1287.
10. Gelsomino F, Balsano R, De Lorenzo S and Garajová I. Small Bowel Adenocarcinoma: From Molecular Insights to Clinical Management. *Current Oncology (Toronto, Ont.)*. 2022;**29:**1223‑1236.
11. Aparicio T, Pachev A, Laurent P P and Svrcek M. Epidemiology, Risk Factors and Diagnosis of Small Bowel Adenocarcinoma. *Cancers Basel*. 2022**;14**:2268.
12. Aparicio T, Svrcek M, Henriques J, Afchain P, Lièvre A, Tougeron D, et al. Panel gene profiling of small bowel adenocarcinoma: Results from the NADEGE prospective cohort. *Int J Cancer*. 2021;**148**:1731‑1742.
13. Pan S I and Morisson H. Epidemiology of cancer of the small intestine. *World Journal of Gastrointestinal Oncology*. 2011; **3:33**-44.
14. Tmiah H, Alice S and Lilienfeld D E. Incidence of small bowel cancer in the United States and worldwide: geographic, temporal, and racial differences. *Cancer causes & control*.2005;**16** :781-787
15. Aydin D, Kefeli U, Ozcelik M, Erdem GU, Sendur MA, Yildirim ME, et al. The Prognostic Utility of the Metastatic Lymph Node Ratio and the Number of Regional Lymph Nodes Removed from Patients with Small Bowel Adenocarcinomas. *Medicina (Kaunas)*. 2023;**59**:1472.
16. Bhamidipati D, Colina A, Hwang H, Wang H, Katz M, Fournier K, et al. Metastatic small bowel adenocarcinoma: role of metastasectomy and systemic
17. chemotherapy. *ESMO Open*. 2021;**6:**100-132.
18. Ouédraogo S, Kambiré JL and Béré B. Cancers primitifs de l'intestin grêle : épidémiologie, diagnostic et traitement dans un contexte de ressources limitées. *Rev int sci méd (Abidj)*. 2022;**24**:63‑69.
19. Dabaja BS, Suki D, Pro B, Bonnen M and Ajani J. Adenocarcinoma of the small bowel: presentation, prognostic factors, and outcome of 217 patients. *Cancer*. 2004;**101**: 518-526.
20. Ersoy GZ, Harewood RN, Weiderpass E, Huybrechts I, Jenab M, Huerta JM, et al. Diet and lifestyle in relation to small intestinal cancer risk: findings from the European Prospective Investigation into Cancer and Nutrition (EPIC). *Cancer Causes Control*. 2023;**34**: 927-937.
21. Bennett CM, Coleman HG, Veal PG, Cantwell MM, Lau CCL andMurray LJ. Lifestyle factors and small intestine adenocarcinoma risk: A systematic review and meta-analysis. *Cancer Epidemiol*. 2015;**39**: 265-273.
22. Wu AH, Yu MCand Mack TM. Smoking, alcohol use, dietary factors and risk of small intestinal adenocarcinoma. *Int J Cancer*. 1997;**70**: 512-517.
23. Shomba S, Kinyamba F, Mukoka N, Olela N, Kamimar Tet Mbalanda W : Monographie de la Ville de Kinshasa. ICRIDES 2015.

Cite this article as: Pezo SD, Mumbere JMK, Kingebeni GN, Mpwate SK, Mbatu VK, Mukendi TL, *et al*. Histopathological profile of small bowe cancers in the City of Kinshasa, Democratic Republic of the Congo. *Ann Afr Med* 2024; **17** (2): e5455-e5461. https://dx.doi.org/10.4314/aamed.v17i2.4

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