

 <p>ISSN NO. 2320-5407</p>	<p>Journal Homepage: -www.journalijar.com</p> <h2 style="text-align: center;">INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)</h2> <p style="text-align: center;">Article DOI:10.21474/IJAR01/20333 DOI URL: http://dx.doi.org/10.21474/IJAR01/20333</p>	 <p>INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR) ISSN 2320-5407 Journal Homepage: http://www.journalijar.com Article DOI:10.21474/IJAR01/20333</p>
---	---	---

RESEARCH ARTICLE

PROGNOSTIC FACTORS OF DIGESTIVE ONCOLOGICAL EMERGENCIES IN THE ELDERLY: CASE STUDY

A. Nazari, I. Jarir, K. Khaleq, S. Chaabi, A. Erragh, K. Khalleg, A. Nssiri, A. Bouhouri, R. Harrar
Réanimation des urgences chirurgicales pavillon 33, CHU Ibn Rochd Casablanca.

Manuscript Info

Manuscript History

Received: 27 November 2024

Final Accepted: 30 December 2024

Published: January 2025

Abstract

The number of patients with digestive cancers, aged over 65-year-olds admitted in emergency is clearly increasing. The purpose of this study was to assess the prognosis factors care improvement and management of elderly before, during and after surgery, the predictors of mortality and morbidity following emergency oncological digestive surgery in patients aged 65 years and older, the therapeutic management and study survival, prevention and surveillance, to compare them with the data of the literature. Our study included 86 patients admitted to visceral emergencies for an urgent syndrome revealing or complicating a primary or secondary digestive cancer, and who required immediate surgical intervention and who had stayed at the 33 surgical resuscitation department in the IBN-ROCHD UNIVERSITY HOSPITAL CENTER (UHC) of Casablanca on a duration of 4 years from January 10, 2016 to May 05, 2019. Several data were entered on Excel and analyzed using the SPSS version 20 software:

- Epidemiological, concerning age and gender;
- Clinics including risk factors, history, general condition of the patient and clinical examination data;
- Para-clinical, interesting biological assessments, and morphological examinations
- Medical and surgical therapeutics;
- Postoperative follow-up
- Treatment results.

The most frequent sites were rated in order of increasing frequency: Colo-rectal (40.7%), small intestine (22.1%), pancreas (10%), and biliary tract (8.1%). 72.09 % of patients were between 65 and 75 years, while only 27.91 % were 76 years old and over. This study includes 44 women and 42 men with a sex ratio of 0.96. The evolution method was mostly acute in 95% of cases. Our patients have consulted for urgent clinical presentations mainly occlusive syndrome noted in 59% of patients. The surgery was done in 62% for palliative indication: 55% were operated for an ostomy discharge, 32% for a palliative resection, 17% for an ostomy supply and 13% for a digestive bypass. Postoperative outcomes were 35% morbidity and 48% mortality. The

main cause of death was hemodynamic instability in 34% of cases. Thanks to multivariate statistical analysis four factors were

deduced significantly related to mortality: Morbidity; the CONUT score, hypoalbuminemia, and admission for a Bowel obstruction. In our context, digestive cancers in elderly are a frequent reason for emergency consultation. The majority of surgical interventions were palliative and the postoperative outcome is marked by high morbidity and mortality. Small changes in morbidity and mortality could have a significant impact, both on the results, on the high cost of prolonged hospitalization, and on the incidence of perioperative complications. This will require a good knowledge of the predictive mortality factors both by the anesthetist and by the visceralist surgeon.

Copyright, IJAR, 2025,. All rights reserved.

..... **Introduction:**

The incidence of cancer in geriatric patients is increasing each year with currently 15.1% of the population being older than 65 years and that number is expected to increase to 21.4% in 2050.

In 2015, 60.9% of cancers occurred in patients over 65 years, and 10.9% after 85 years. In addition, cancer mortality is higher in elderly patients with 75.3% of all cancer deaths after 65 years and 24% after 85 years. [1]

The distribution of cancers by age group and by location shows a predominance of skin cancer (26%) and digestive (24%) in subjects over 60 years old.

Digestive cancers are a heterogeneous group of malignant tumors; at various locations, from the esophagus to the rectum, in addition to the digestive glands.

They require adequate care without any delay.

Many patients with cancer are diagnosed through an emergency presentation, which is associated with inferior clinical and patient-reported outcomes compared with those of patients who are diagnosed electively or through screening. [1-2]

Therefore, this increase in life expectancy and confidence, justified in the progress of anesthesia resuscitation and surgery bring about more and more elderly patients to be taken care of urgently.

When it comes to oncological digestive emergencies a lot of efforts and challenges are made by oncologists, intensive care physicians and surgeons in our University Hospital Center (IBN ROCHD UHC Casablanca, Morocco) and particularly at the oncology Center LALLA SALMA, visceral surgery 35 department and unit of surgical resuscitation 33.

Knowledge of prognostic factors is important for therapeutic decisions but also for the interpretation of literature data and for designing clinical research. For this purpose, we conducted a retrospective study with a descriptive analysis of all patients, aged 65 years and older, hospitalized in P33 surgical resuscitation operated in emergency department digestive surgery P35;

For these reasons, the purpose of this study was to assess:

- the prognostic factors care improvement and management of elderly before, during and after surgery;
- the predictors of mortality and morbidity following emergency oncological digestive surgery in patients aged 65 years and older;
- the therapeutic management;
- Study survival, prevention and surveillance.

Materials and Methods:

We conducted a descriptive and analytical retrospective study from records of patients over the age of 65 operated urgently for digestive cancer emergency within the Emergency Resuscitation Service 33 and Emergency Department 35 visceral surgery at the University Hospital Ibn ROCHD Casablanca.

To approach this study, we have prepared a log of exploitation to study the files and collect the data:

- Epidemiological, concerning age and gender;
- Clinics including risk factors, medical and surgical history, the general condition of the patient and the clinical examination data;
- Para-clinics, interesting biological assessments, and morphological examinations;
- Medical and surgical therapeutics;
- Postoperative follow-up;
- Treatment results.

All the data collected were entered into Excel and analyzed using the SPSS version 20 software.

Results:

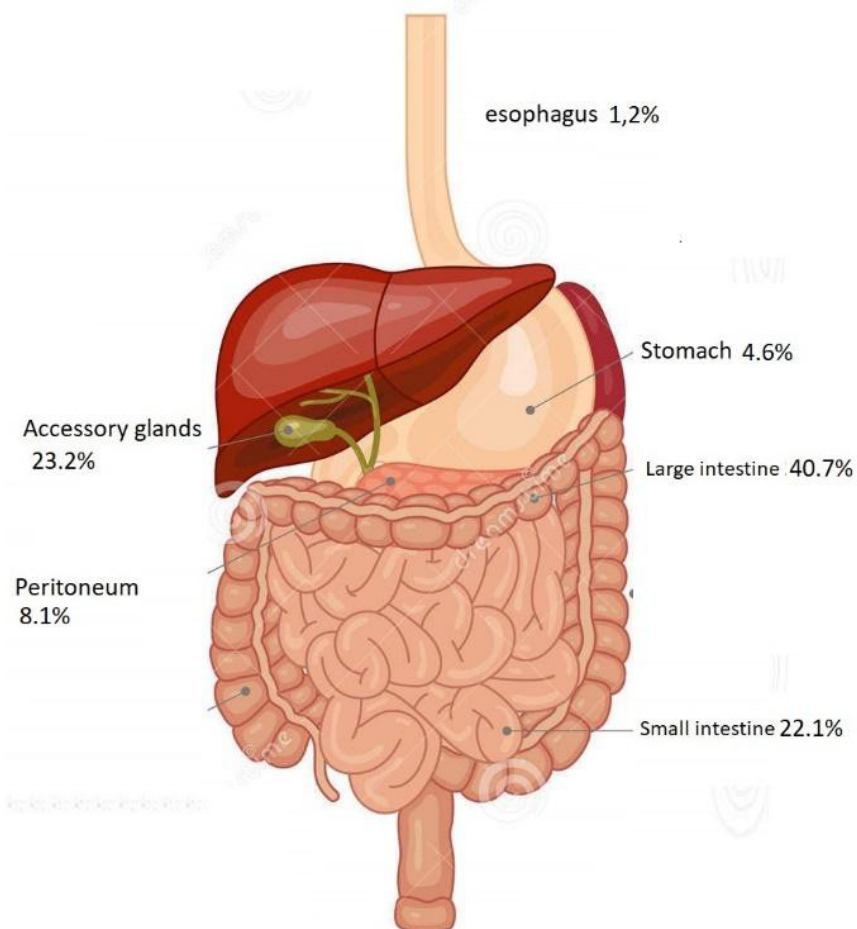
86 patients over 65 years of age were operated on for a digestive carcinologic surgical emergency at the IBN-ROCHD University Hospital Center in Casablanca on a duration of 4 years from January 10, 2016 to May 05, 2019.

In our series, the most frequent location was the large intestine with 35 cases(40.7%), followed by Accessory glands by 20 cases (23.2%),pancreatic with 9 cases (10%), liver with 4 cases (4.6%), and biliary tract tumoral process with 7 cases (8.1%); on the other hand, the stomach and the esophagus presented the least affected organs.

Table I: Case Distribution by Topography

Topography	Frequency	Pourcent
Large intestine	35	40.7%
Accessory glands	20	23.2%
Small intestine	19	22.1%
Peritoneum	7	8.1%
Stomach	4	4.6%
Esophagus	1	1.2%

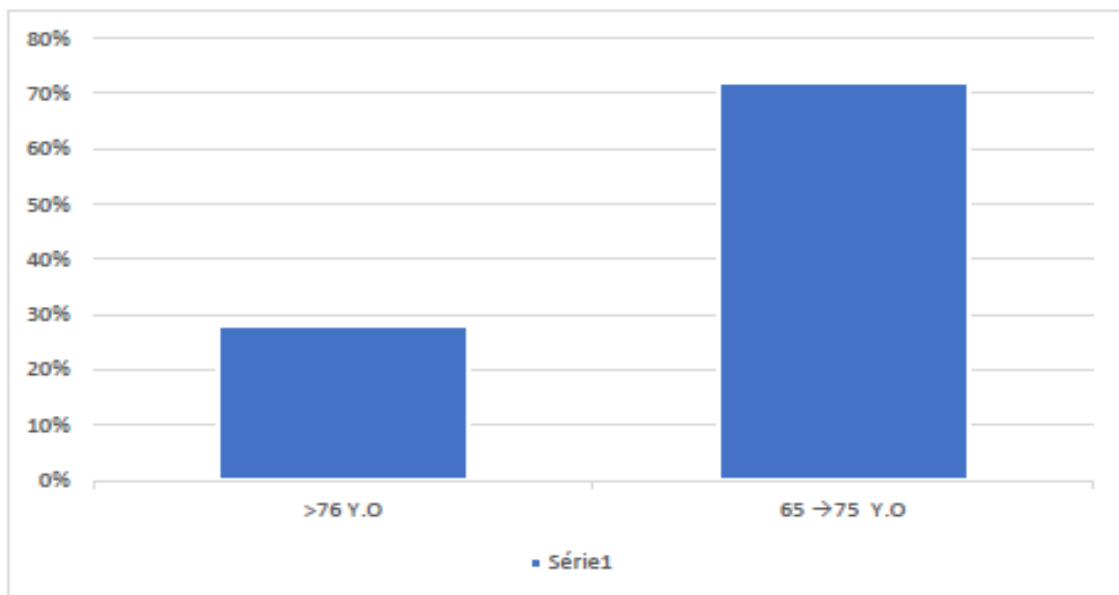
DIGESTIVE TRACT



The age of our patients varies between 65 and 90 years old with an average age of 71.45 years. When considering age groups, 72.09 % of patients were between 65 and 75 years, while only 27.91 % were 76 years old and over.

Table II: Distribution of Cases by Age

Age	Nombre de cas	Pourcentage
65->75 year old	62	72.09%
> 76 year old	24	27.91%

**Figure 1 : Distribution of the target population by age group**

Out of the 86 patients, 42 (49%) were men and 44 (51%) were women, with a female predominance and a sex ratio of 0.96.

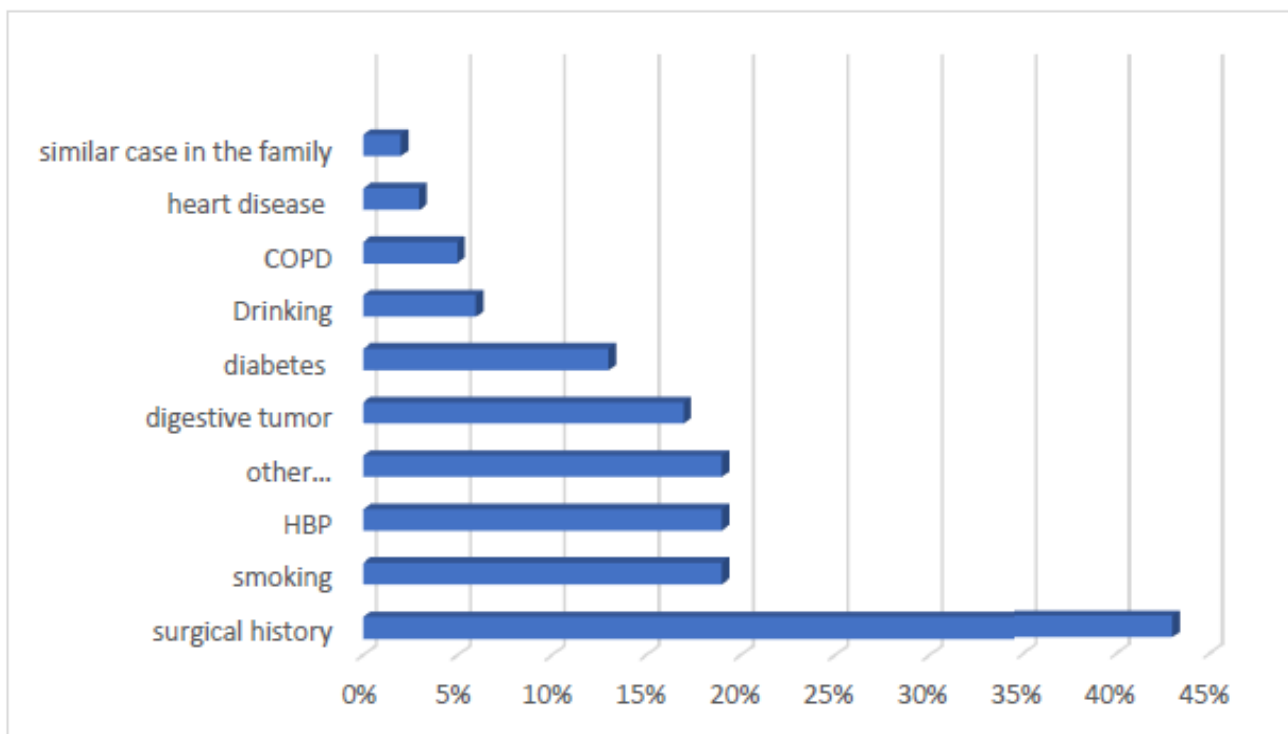
In our series, 65 patients (75%) had comorbidities mainly made of high blood pressure (22%), diabetes (13%), other digestive tumors (17%), COPD (6%).

11 patients (13%) were operated for cholecystectomy, which is a risk factor for colorectal cancer.

19% had smoking status and 6% had alcohol status.

19% had other comorbidities such as: gout, arthrosis, penicillin allergy, thyroid disorders.

2% had similar case in the family.



● **Figure 4 : Distribution of cases according to medical history.**

In conclusion, the major risk factors were:

- Smoking (18 patients so 21%),
- Alcohol: 14 patients were alcoholic (16%),
- Diabetes type 2: In our series, diabetics were 11 (13%),
- Other risk factors: Cholecystectomies 11 (13%), 2 cases of colonic polyps and 1 anal polyp.

In conclusion, in our study, patients with one or more risk factors presented 53 cases (62%).

The reason for admission to the emergency unit was mainly:

- bowel obstruction (59%)
- peritonitis (20%)
- icterus (6%)
- jejunostomy (3%)
- Epigastralgia (3%)
- gastrectomy (3%)
- Hemorrhages digestives: Rectal (2%)
- enterocutaneous fistula (2%)
- Pyloric stenosis (1%)
- wall infection (1%).

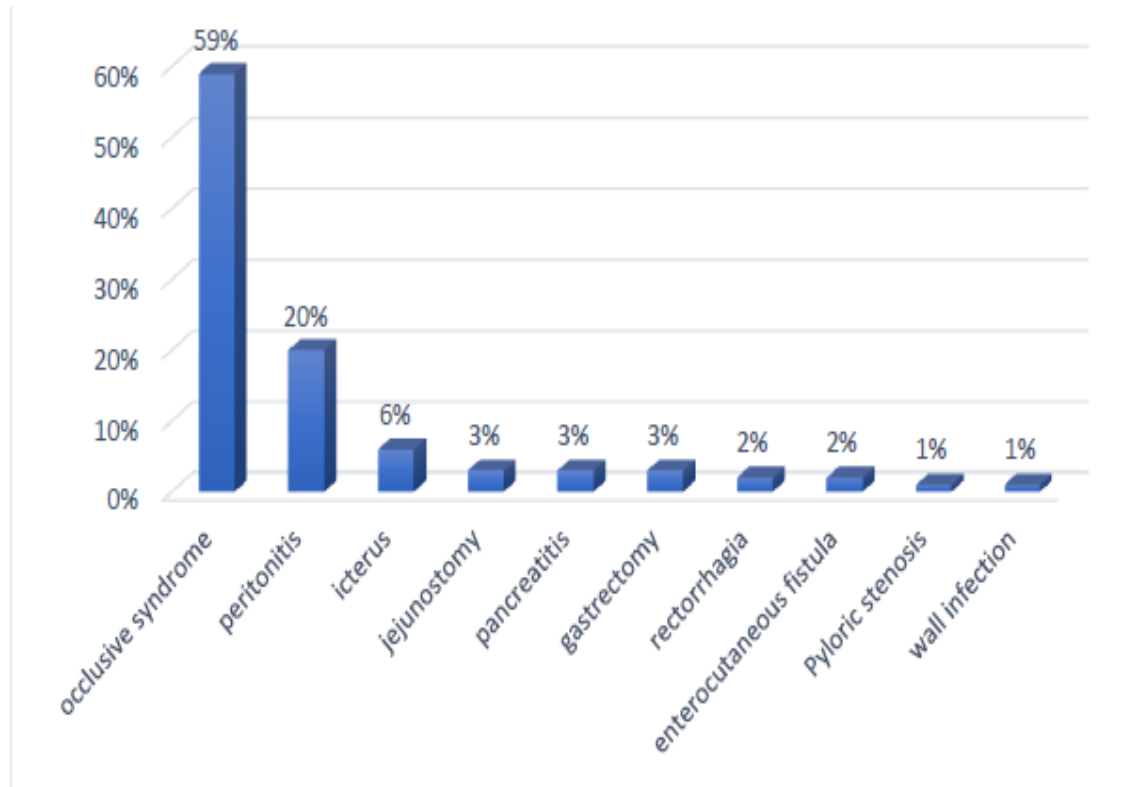


Figure 6 : distribution of the target population by reason of hospitalization

The installation was chronic in only 4 cases (4.6%), whereas the acute installation was 82 cases (95.4%).

At admission only 1 patient was intubated/ventilated, 2 had a Glasgow score of 13/15, also 2 had 14/15 and the rest of the patients (81 patients) were fully conscious (15/15).

4 patients out of 86 came in a state of shock.

Concerning surgery, 53 surgeries (62%) were performed for palliative purposes versus 32 for curative indications (37%); knowing that only one patient was not operated.

Palliative surgeries were represented by :discharge colostomy in 21 patients (40%), discharge ileostomy in 8 patients (15%), feeding jejunostomy in 8 patients (15%), feeding gastrostomy in 1 patient (2%), 7 cases of biliodigestive bypass(13%), 2 cases of gastro jejunal diversion (4%), and 17 of palliative tumor resection (32%) (tumor resection is considered a palliative procedure when associated with an ostomy or palliative objective anastomosis).

Concerning curative gestures, tumor resection was noted in 32 patients (37%) operated, and cavity drainage was performed in 64 patients (76%).

The number of patients who died was 41, representing an overall mortality of 48%; Among these, 23 patients (56%) had a bowel obstruction as diagnosis, 12 patients had peritonitis (29%) and the 6 deceased left (15%) had icterus, wall infection and pyloric stenosis.

Comparing the death rate of deceased patients who were admitted for bowel obstruction with those who didn't, the difference was found to be very significant : 32 patients (62.7%) among the deceased had bowel obstruction. 12 of the deceased patients had peritonitis (29%). the main diagnosis found was tumoral tissue process (35%).

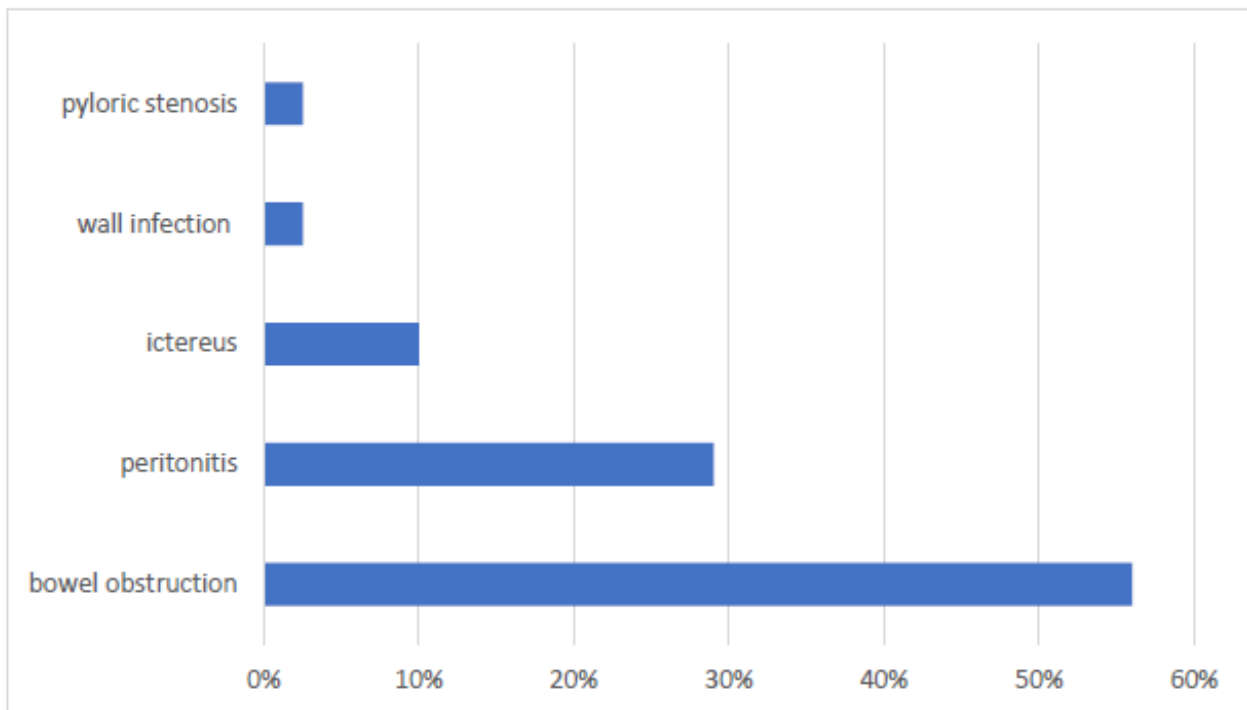


Figure 35: distribution of mortality by reason for hospitalization.

Of 41 deceased patients, 17 patient (65.4%) had an hypoalbuminia, and 50% of patients with a renal failure passed away.

The “CONUT score” (Controlling nutritional status) was statistically very significant with a high mortality rate in patients who had Severe Malnutrition status. In our study, Of the 41 deceased patients, 6 patients (15%) had a severe malnutrition status, 30 patient (73%) had a moderate malnutrition status and 5 patients (12%) had a light malnutrition status.

Abdominal CT scan was the first examination performed in 71%, followed by the abdominal x ray (AXR) in 31% and, respectively the Abdominal ultrasound.

The abnormalities found at the abdominal CT scan were mainly: a digestive tumor of variable localization in 52 patients (60%) and an occlusion in 25 patients (29%), of 41 deceased patients, the CT scan diagnosis was mainly the large bowel cancer with 19 cases (47%), and the small bowel cancer with 10 cases (25%).

Considering the experience of the anesthetist, there is a small statistically significant difference between the deceased and the survivors. The mortality was 61% (11) among the 18 patients anesthetized by junior doctors in training, while the mortality was 44% (30) among the 68 patients anesthetized by seniors.

While considering the experience of the surgeon, there is a significant difference between the deceased and the survivors, the more the doctor has less experience, the higher the mortality rate. The mortality was 66% (10) among the 15 patients operated by junior doctors in training, while the mortality was 44% (31) among the 71 patients operated by seniors.

Depending on the duration of the surgical procedure: The mortality was 39% (16) for the 45 patients operated within more than 3 hours.

According to the surgical gesture, the mortality was 32% (17) among the 53 patients who had palliative surgery, while the mortality was 78% (25) among the 32 patients who had curative surgery.

According to the intraoperative incidents: The mortality was 72% (8) among the 11 patients who had hemodynamic instability, while the mortality was 100% (3) among the 3 patients who had an intraoperative bleeding.

The mortality was 57% (22) among the 38 patients who were admitted to the ICU for hemodynamic instability, while the mortality was 39% (18) among the 46 patients who were admitted for postoperative suites and 100% among the only patient who was admitted for a had Consciousness disorder.

The mortality was 65% (26) among the 40 patients to whom we administered Catecholamines, while the mortality was 33% (15) among the 46 patients who did not receive vasoactive drugs.

The most common causes of death were: hemodynamic instability in 14 patients (34%), septic shock in 11 patients (27%), cardiogenic shock in 7 patients (17%), respiratory in 4 patients (9%), neurological in 2 patients (5%), and surgical in 3 patients (8%).

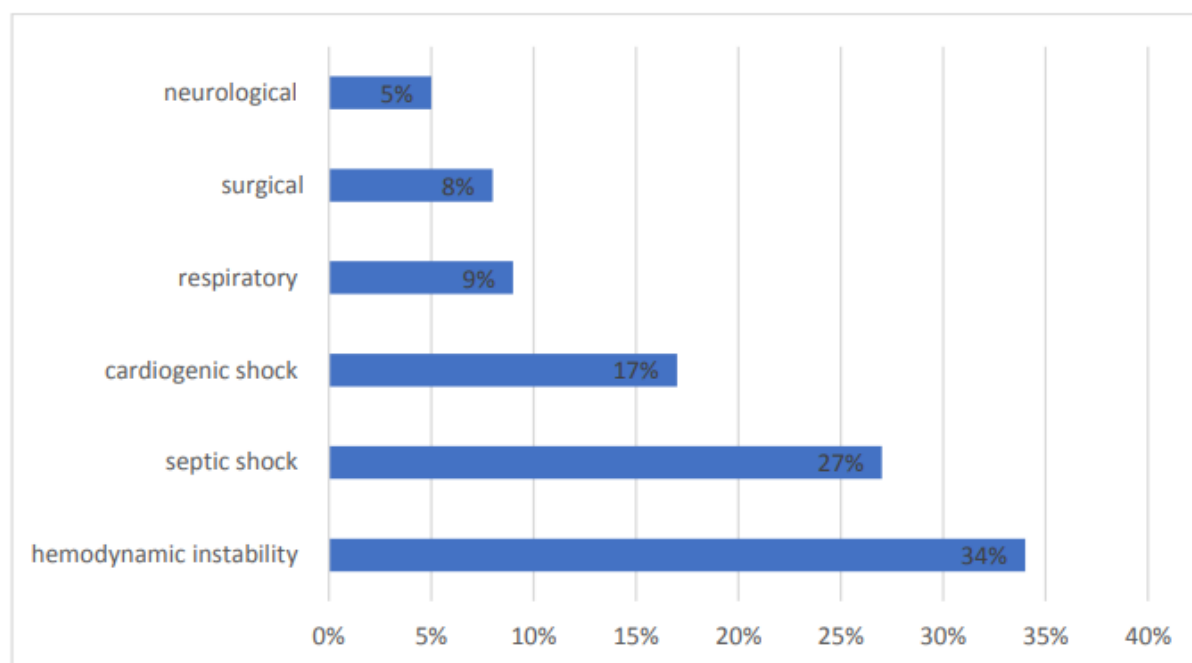


Figure 48: distribution of deceased by causes of death.

According to morbidity, and comparing the mortality rate of deceased patients who had post-operative complications with those who did not have complications, the difference was clearly significant with a high mortality rate in patients who had complications: 30 patients deceased (75.6%). Although, in our series, 31 patient (36%) had postoperative complications such as sepsis (29%), metabolic (29%), respiratory (17%), cardiovascular (13%), renal (6%), and neurological (6%).

Discussion:

Gastric cancer is the leading digestive cancer in Morocco. The median age is 65 years for men and 50 years for women. In Marrakech A retrospective study of 440 digestive cancers admitted to radiotherapy oncology during the period from 2003 to 2007 presented the following values: digestive cancers constitute 12.62% of all cancers, colorectal cancer was the most common cancer with 35.68% of cases, followed by stomach cancer, which was second with 33.86% of cases. [3]

According to SEER CANCER STATISTICS REVIEW, the digestive system represents the most frequent location in

the article's series with 1120 cases (20.25%) of all cases; reaching the device, digestive cancer is distinguished by an elevated frequency in colorectal cancers with 464 cases (41.43%) and gastric cancers with 332 cases (29.64%), followed by liver cancers with 91 cases (8.12%), dominated by metastases in 46% of cases. [4]

Overall, the majority of studies cited have shown that the most common digestive cancers are: colorectal, gastric, liver, and pancreatic cancers; This does partly match the results of our study which revealed that the most affected digestive organs by malignant pathology are in order of frequency: the large intestine (colo-rectum), small intestine, pancreas and biliary tract. Our results are affected by the fact that in our series, we have included cases of digestive cancers complicated or urgent and which required hospitalization in the intensive care unit.

Table: The frequency of digestive cancers according to the topography by series

Location	Our study : 86 cases	Hassan II Fès UHC: 1120 cases	Mohammed VI Marrakech UHC: 1052 cases	Chlef UHC: 388 cases
Colorectum	40.7%	41,43%	26,4%	22%
Small intestine	22.1%	7,86%	1,2%	1,7%
Pancreas	10%	5,18%	1%	5,18%
biliary tract	8.1%	5,18%	8,1%	9,52%
Liver	4.6%	8,12%	4,6%	8,12%
stomach	4.6%	29,64%	45,6%	35%
Esophagus	1.2%	5,98%	9%	6%

At the Brest metropolitan Océane agglomeration, for the 5-year survival rates, the highest rates were for colorectal cancer (46%), anal cancer (43%) and small intestine (39%). The lowest rates were for pancreatic cancer (5%), esophagus (7%) and liver (7%). Pancreatic, liver, gallbladder and bile duct cancers had the shortest median survival (<9 months).

In a prospective multicenter study in St James's Hospital Trinity College Dublin, Ireland, it was found that patients aged 80 or over had higher hospital mortality compared to patients between 65 and 79 years, and age represents an independent mortality-associated risk factor in this very elderly cohort.[5]

In our series considering age groups, the difference was not significant.

Most observational studies have found that cancer patients with comorbidities have poorer survival than patients without comorbidities.

In our series 66% of deceased patients had comorbidities, in contrast, 69% of survivors had comorbidities. the difference was found to be insignificant.

Worldwide, smoking is the most confirmed and most frequent risk factor for digestive oncology [6-7]. This same result is also found in Morocco[8]. Studies have also shown that the importance of the carcinogenic role of smoking differs according to the localization of the neoplasia, for example the risk of cancer of the esophagus is multiplied by 32 in the smokers [9], for the colorectal cancer the percentage of the smoking cases are 21.7%, while tobacco is not an essential etiological factor of gastric cancer [10]. We had the same conclusions from our study, and smoking was the most common risk factor with 21%.

Obesity is also a major risk factor; digestive cancers are the most sensitive cancers to overweight whatever their location.

In a study made in the Department of Surgery, Radboud University Medical Center, The Netherlands, bowel obstruction was one of the most frequent emergencies in general surgery, commonly affecting elderly patients. Morbidity and mortality from bowel obstruction in elderly was high. Approximately 10–12% of patients above 65 years presenting with abdominal pain at the emergency department (ED) were diagnosed with bowel obstruction.

In our study, 59% had a suspicion of a bowel obstruction, and comparing the death rate of deceased patients who were admitted for bowel obstruction with those who didn't, the difference was found to be very significant.

Hypoalbuminemia is a sign of severe and prolonged malnutrition. In our series 30% of patients had severe malnutrition, and mortality in patients with albumin level $\leq 30\text{g/l}$ was statistically significant.

Controlling nutritional status (CONUT) is a newly proposed scoring system, which was originally reported as a screening tool for assessing a patient nutritional status [11]. It can be calculated from three blood parameters: serum albumin concentration, total peripheral lymphocyte counts, and total cholesterol concentration, each of them easily measured from a venous blood sample. Serum albumin was not only a strong marker of host nutritional status, and also can be affected by non-nutritional factors such as hepatic functional reserve and inflammation. Many studies have shown that low serum albumin level was associated with poor survival in gastrointestinal cancers, and correlated with increased tumor-associated inflammatory factors, such as interleukin-6, a cytokine associated with progression of multiple GI cancers.

A study in Department of Surgery, Kobe University, Japan, reviewed 211 elderly patients aged 75 years or over who underwent curative resection for gastric cancer from 2000 to 2015. Patients with a higher CONUT score had significantly shorter overall survival.

In our study, Of the 41 deceased patients, 6 patients (15%) had a severe malnutrition status, 30 patient (73%) had a moderate malnutrition status and 5 patients (12%) had a light malnutrition status. The CONUT score was statistically very significant with a high mortality rate in patients who had Severe Malnutrition status.

The surgical procedure can be practiced by a professor, a senior resident physician (4-5 years of specialty training) or a junior resident physician (1-2-3 years of specialty training). In our series surgical procedures were performed by senior doctors in 83% of cases, by junior doctors in 14% of cases. The mortality was 66% (10) among the 15 patients operated by junior doctors in training, while the mortality was 44% (31) among the 71 patients operated by seniors.

A study evaluating the frequency of post-operative infections, reported a higher incidence of infectious complications in junior operators than in senior surgeons [12], according to Touré et al., the majority of emergency procedures were performed by surgeons in training. Persistent peritonitis may find technical fault due to lack of experience [13]. In our univariate analysis, the surgeon's experience has a statistically significant value, the more the doctor has less experience, the higher the mortality rate, this may also be due to the decrease in performance in an emergency situation. the workload because of lack of staff, but it was not according to the multivariate study a predictive factor of mortality.

Several authors report that the use of vasoactive drugs influences mortality in intensive care [14,15,16,17]. The need for vasoactive amines is a marker of clinical severity and excess mortality in resuscitation. In our series, mortality was 65% (26) among the 40 patients to whom we administered Catecholamines.

At the University Hospital of Amiens, in France, in univariate analysis, patients deceased had significantly more medical complications (78.9% vs 45%) from all causes, especially shocks (34.2%) and sepsis (34.2%). Among surgical complications, anastomotic fistula was significantly the main one. The data from the literature are consistent with the results of our study, it was found that the deceased patients who had postoperative complications had a high mortality rate. [18; 19; 20; 21].

Conclusion:

The literature on prognostic factors for postoperative morbidity and mortality in elderly patients undergoing carcinologic emergency surgery is very limited. Most of the available studies are exploratory, most of the evidence is of limited quality and the results are contradictory. Given the aging of the population and the future needs associated with emergency surgery in older patients, it is necessary to conduct quality research in this area.

In our context, digestive cancers in elderly are a frequent motive emergency consultation.

Our study showed that four factors were significantly related to mortality: Morbidity; the CONUT score, hypoalbuminemia, and admission for a Bowel obstruction. The most common pattern was the large intestine cancer (colorectal), followed by small intestine cancer, pancreatic cancer, and biliary tract cancer.

The majority of surgical procedures were with a palliative objective. The most common surgical procedures were the discharge ostomy and then the digestive bypass.

Small changes in morbidity and mortality could have a significant impact, both on the results, on the high cost of prolonged hospitalization, and on the incidence of perioperative complications. This will require a good knowledge of the predictive factors of mortality, both by the resuscitative anesthetist and the visceralist surgeon.

References:

1. Les stratégies de dépistage des cancers - Dépistage et détection précoce [Institut National Du Cancer [Internet]. Disponible sur : <http://www.e-cancer.fr/Professionnels-de-sante/Depistage-et-detection-precoce/Strategies-de-depistage>.
2. Soto-Perez-de-Celis, E., de Glas, N. A., Hsu, T., Kanesvaran, R., Steer, C., Navarrete-Reyes, A. P., ... Hurria, A. (2017). Global geriatric oncology: Achievements and challenges. *Journal of Geriatric Oncology*, 8(5), 374–386. Claire Dehaen Rougelin. Facteurs pronostiques de mortalité des patients très âgés hospitalisés en réanimation chirurgicale. *Médecine humaine et pathologie*. 2017. <dumas-01524925.
3. Mohammed Benlahfid, Épidémiologie descriptive de la carcinose péritonéale d'origine digestive à l'Hôpital Universitaire Ibn Rochd de Casablanca (2008-2010), *Pan African Medical Journal*, 27, 2017
4. National Cancer Institute (2016) SEER Cancer Statistics Review, 1975– 2013. Howlader N NAKMMDBKASKCYMRJTZMALDCHFECK, ed. (Bethesda, MD:), pp.
5. Martin-Loeches, Risk factors for mortality in elderly and very elderly critically ill patients with sepsis: a prospective, observational, multicenter cohort study, *Annals of Intensive Care* 02/2019, 9;1, P26.
6. Diarra M, Konate A, Traoré CB, Souckho-Kaya A, Diarra CA, Doumbia- Samaké K, et al. Épidémiologie des cancers digestifs en milieu hospitalier à Bamako *Hegel Vol. 2, N° 1*, 2012.
7. Bagny A, Bouglouga O, Darre T, Lawson-Ananissoh L-M, Kaaga Y-L, Sonhayé L, et al. Profil épidémiologique et diagnostique des cancers digestifs au CHU Campus de Lomé : à propos de 250 cas *J. Afr. Hépatol. Gastroentérol. Lavoisier* 2015.
8. Aqodad N, Benajah D, El Abkari M, Ibrahimi A, Mellouki I, et al. Les cancers digestifs à Fès: quelle épidémiologie en absence d'un registre national JFHOD: Société Nationale Française De Gastro-entérologie.
9. Osagiede, O., Spaulding, A. C., Cochuyt, J. J., Naessens, J. M., Merchea, A., Crandall, M., & Colibaseanu, D. T. (2019). Factors Associated With Minimally Invasive Surgery for Colorectal Cancer in Emergency Settings. *Journal of Surgical Research*, 243, 75–82.

10. Steinmetz J, Spyckerelle Y, Guéguen R, Dupré C Le tabac et l'alcool augmentent le risque d'adénomes et de cancers colorectaux Presse Med. 2007, 36: 1174-82
11. Ignacio de Ulíbarri J, González-Madroño A, de Villar NG, González P, González B, Mancha A, Rodríguez F, Fernández G, CONUT: a tool for controlling nutritional status. First validation in a hospital population. Nutr Hosp. 20(1) (2005) 38-45.
12. Lau W, Fan S, Wah Chu K. Influence of surgeon's experience on postoperative sepsis. Am J Surg. 1988;155(2):322-6. [PubMed]
13. Alpha Oumar Touré, 1, & Mamadou Cissé, 1 Ibrahima Ka, 1 Madieng Dieng, 1 Ibrahima Konaté, 1 Ousmane Ka, 1 et Cheikh Tidiane Touré 1 Diffuse post-operative intra abdominal sepsis : epidemiological, diagnostic and therapeutic aspects at the general surgery service of university hospital Aristide de Dantec in Dakar; Pan Afr Med J. 2014; 17: 204.
14. Aggarwal, D.A, et al , predictors of mortality and resource utilization in cirrhotic patients admitted to the medical ICU. CHEST Journal ,2001.119(5):P.1489-1497
15. Kollef, M.H, T. Wragge , and C . Pasque, Determinants of mortality and multiorgan dysfunction in cardiac surgery patients requiring prolonged mechanical ventilation. CHEST Journal, 1995.107(5):P.1395-1401.
16. Rocker, G et al , Clinician predictions of intensive care unit mortality. Critical care medicine ,2004.32(5):P.1149-1154.
17. Osmon, S, et al , The influence of infection on hospital mortality for patients requiring >48h of intensive care . CHEST Journal , 2003.124(3):p.1021-1029.
18. Gerin Olivier Thèse : Mortalité après colectomie pour cancer colorectal chez les patients de plus de 75 ans : Analyse classique versus la «Root Cause Analysis» faculté de médecine d'Amiens, 2016, N°135
19. M. EZZAHRI Thèse : Pronostic du cancer de l'estomac opéré Université Mohammed V – Soussi Faculté de médecine et de pharmacie – Rabat, 2013, N°166
20. Eastern Mediterranean Health Journal La Revue de Santé de la Méditerranée orientale EMHJ • Vol. 19 No. 3 • 2013
21. Lipska, M.A., Brouwer, R.R., Parry, B.R. et al. Tech Coloproctol (2006) 10: 147. doi:10.1007/s10151-006-0270-5.