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Study of the different types of digestive lesions: Epidemiological and histopathological aspects

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Abstract

This work aims to study the histopathological aspect of different lesions of the digestive tract and their distribution according to age and sex during a period from January 2014 to March 2018. This work was carried out at the anatomopathology department of El-Tarf hospital. We counted a total of 1006 cases of lesions of the digestive tract. The results obtained show that:

- The most affected age group is between 11 and 50 years old, especially between 31 and 40 years old, the rate of digestive pathologies is subdivided between men and women.
- An increase in digestive lesions each year (2014-2018).
- The majority of these lesions are concentrated in the appendix (benign lesion), followed by lesions of the stomach and anus and finally the colon.
- Benign lesions of the inflammatory and mechanical type represent a majority against the other types of lesions, among the inflammatory and mechanical lesions, appendicitis is the most frequent type, and lesions of the esophagus are too rare.
- Chronic atrophic gastritis presents the majority of stomach lesions, followed by interstitial gastritis.
- Duodenal atrophies present the most dominant type in the small intestine, followed by chronic duodenitis and intestinal inflammation.
- Chronic colitis presents the most dominant type in the colon and rectum, followed by adenocarcinomas.
- Hemorrhoids present the highest rate of anal pathologies followed by anal fissures and finally anal fistulas.

We have studied the microscopic appearance of chronic atrophic gastritis, low-grade gastric dysplasia, acute appendicitis and rectal tumor.

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Introduction

Unfortunately, our current life offers us poor and processed food, a race against time and a medical system full of medicines and vaccines. All of these elements will contribute to the disruption of a complex system involving many organs. Diseases of the digestive system still represent a real public health problem today, both because of their prevalence and the impact they have on patients' lifestyles, and because of the cost of their diagnostic and therapeutic management at a time when the public health system is still in a state of flux (Kahia, 2015). Certain diseases such as depression, hyperactivity, attention deficit disorder, Parkinson's disease, multiple sclerosis and psychiatric disorders have frequent or even serious digestive disorders long before the disease takes hold. Some even call it our second brain because its role does not stop with digestion. Diseases of the digestive system are a collection of acute and chronic conditions that vary widely in terms of natural history, risk factors and prognosis. They can affect the digestive tract (from the oral cavity to the rectum), the peritoneum, as well as the liver, bile ducts and pancreas. Some of these conditions are both severe and relatively common, such as liver disease and chronic inflammatory bowel disease (Zuffereya *et al*., 2005).

The objectives of this work would be:

- To study the retrospective epidemiological profile in individuals with lesions of the digestive tract at the level of El-Tarf hospital during a period from 2014 to March 2018.
- To evaluate the importance of each type of gastrointestinal tract pathology. All these pathologies are recorded within the region of El-Tarf, pushing us to look for the causes and the risk factors and other distribution factors.
- To study the anatomopathological aspect of certain types of lesions.

Materials and methods

Epidemiological study

This is a case study of 1006 patients with lesions of different organs of the digestive tract between 2014 and 2017 and the first three months of 2018 at the pathology laboratory of El-Tarf hospital. These cases are divided according to: age, sex, organ of the pathology and type of the lesion.

Experimental study

Technique of anatomopathological study of tissues

Fastening

The samples are fixed in formol (is done immediately), it aims at the conservation of the structures and the hardening of the pieces. The most commonly used fixing liquids are formalin or Bouin liquid. The volume of the fixative must be about 10 times the volume of the specimen. The duration of the fixation depends on the size of the specimen: at least 2 to 5 hours for a biopsy and 48 to 72 hours for an operation specimen.

Macroscopy

Direct examination with the naked eye: the piece is examined, measured, weighed, palpated and then dissected. The parts of the specimen for microscopic study are put into cassettes, the biopsies deposited directly into plastic cassettes. The rest of the specimen is stored for a few days or weeks to allow for further sampling if necessary.

Automatic circulation

It consists of treating the parts for 18 hours in a series of intermediate liquids. These are placed in a specialized apparatus called an Automaton; consisting of 2 tanks of formaldehyde, 6 tanks of ethanol (dehydration in order to eliminate the water naturally contained in the samples), 2 tanks of xylene (substitution of alcohol by xylene to replace or extract the alcohol and allow the rapid penetration of kerosene) and 2 tanks of kerosene (the fabric which becomes transparent). Parts are transported using numbered perforated plastic cassettes contained in a basket that can be transferred from one bath to the other.

Kerosene inclusion

Include the tissue in a kerosene block for easy handling during and after cutting.

Cutting the blocks

Must be thin from 2 to 5 µm thick. It is performed by the rotating microtome. Slices are unfolded using a bath, then the slides are left to dry in the oven.

Standard HES (Haematoxyline-Eosine-Safran) staining

Hematoxylin colors the nuclei in dark purple, eosin colors the cytoplasms in pink and saffron colors the collagen fibers in yellow.

Mounting

For fixing the slide on histological samples after staining to protect tissue sections and stains from the ambient air.

Microscopic examination

Is done by the doctor using an optical or photonic microscope to further the diagnosis (type of lesions and identify the causative agent).

Archiving

After the diagnosis, the reports are archived in the registers according to the type of sample.

Statistical study

The results ($\bar{x}\pm$ standard deviation: SD) were processed by a software of statistical analysis of data (Minitab), one chose to apply the test *t* of student to compare the means of the various parameters between groups.

Results

Epidemiological study

Distribution of digestive pathologies by age

Fig. 1. shows the variation in the rate (%) of digestive pathologies recorded over the years 2014 to 2018 according to age. The most affected age group is between 11 and 50 years and especially that of 31 to 40 years which marked a significant increase ($p < 0.05$).

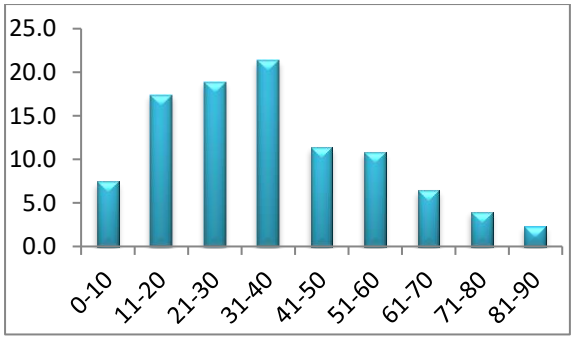

Fig. 1. Distribution of digestive pathologies by age group.

Distribution of digestive pathologies by sex

Fig. 2. shows the variation in the rate (%) of digestive pathologies recorded over the years 2014 to 2018 by sex. The results show that the rate of digestive pathologies is subdivided between men (53.8%) and women (46.2%). The difference between the two sexes is not statistically significant ($P > 0.05$).

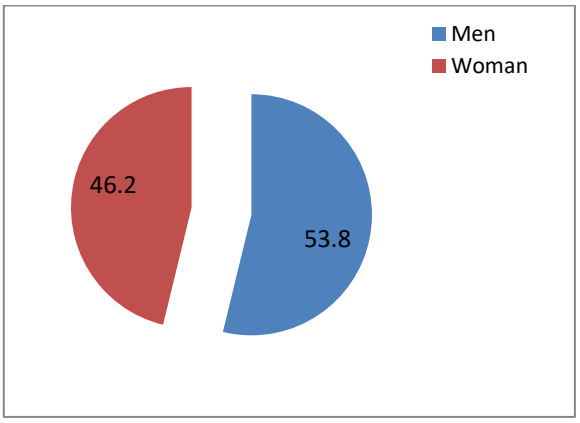

Fig. 2. Distribution of digestive pathologies by sex.

Distribution of digestive pathologies during the years 2014 to 2018

The results show a gradual increase in the rate of digestive lesions every year, in 2017 this increase is significant ($p < 0.05$). Note that there is a highly significant decrease ($p < 0.01$) in the first quarter of 2018 (Fig. 3).

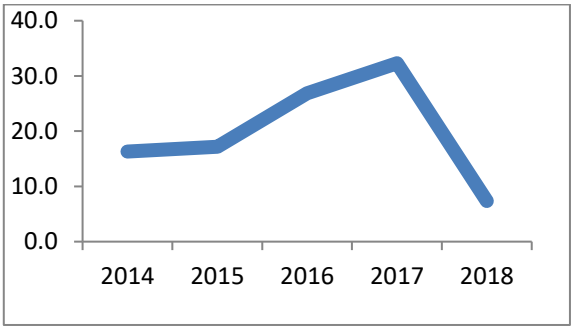

Fig. 3. Distribution of digestive pathologies during the years 2014 to 2018.

Distribution of digestive pathologies according to the seat organ

Fig. 4. show that there is variability in the distribution of patient lesions according to the organ of the digestive tract affected, during the period from 2014-2018. The majority of lesions of the digestive tract

48.5% are concentrated in the appendix (benign lesion), this rate is significantly high ($p < 0.05$). Stomach lesions present a percentage of 20.4%, lesions of the anus (18.4%) and colon (6.8%).

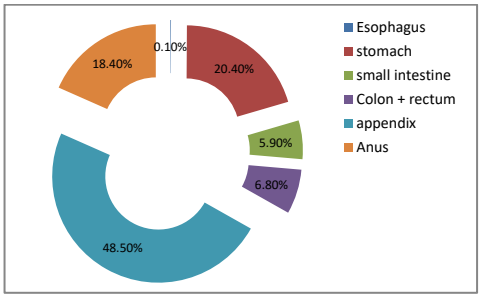

Fig. 4. Distribution of digestive pathologies according to the seat organ.

Distribution of digestive pathologies according to the type of lesion

Benign inflammatory and mechanical lesions represent a majority (92%) compared to other types of lesions. This increase is very highly significant ($p < 0.001$) (Fig. 5).

Among inflammatory and mechanical lesions, appendicitis lesion is the most common type (52.7%) (Fig. 6)

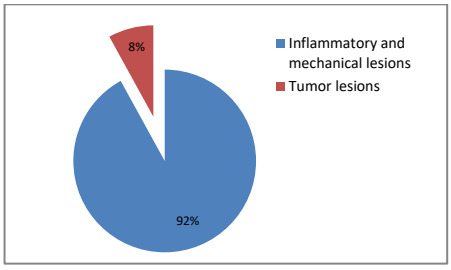

Fig. 5. Distribution of digestive pathologies according to the type of lesion.

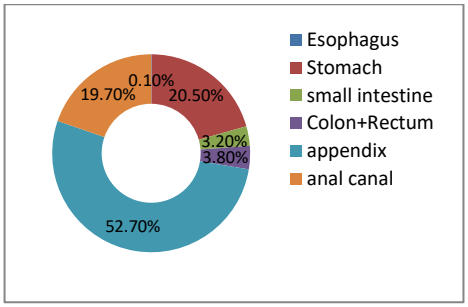

Fig. 6. Distribution of inflammatory and mechanical lesions.

Experimental study

Macroscopic appearance of some digestive lesions

- Fig. 7 shows a macroscopic view of a colonic adenocarcinoma located in the transverse colon, it is surrounded by a layer of fat.
- Fig. 8 shows a macroscopic view of an appendix after acute surgery a small worm-shaped extension located at the end of the large intestine.
- Fig. 9 shows a macroscopic view of a colonic tumor in the sigmoid colon.
- Fig. 10 shows a macroscopic view of an intestinal obstruction after emergency surgery (blockage of the intestinal lumen).
- Fig. 11 shows a macroscopic view of an intestinal obstruction after it has been opened, showing that the intestinal lumen is filled and hemorrhagic.

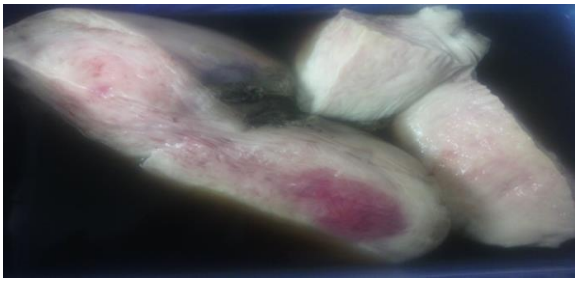

Fig. 7. Macroscopic view of colonic adenocarcinoma.

Fig. 8. Macroscopic view of an appendix.

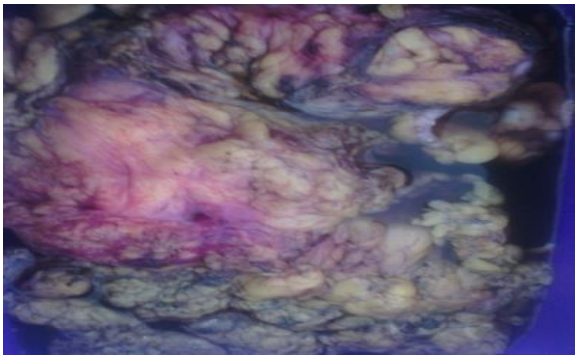

Fig. 9. Macroscopic view of a colonic tumor.

Fig. 10. Macroscopic view of an intestinal obstruction.

Fig. 11. Macroscopic view of an intestinal obstruction after opening.

Microscopic appearance of some digestive lesions

- Fig. 12 shows the microscopic appearance of a healthy gastric mucosa characterized by pylori, glands (normal composition of the gastric mucosa).
- Fig. 13 shows the microscopic appearance of chronic atrophic gastritis characterized by an inflammatory infiltrate, and epithelial lesions that can cause atrophy.
- Fig. 14 shows the microscopic appearance of low-grade gastric dysplasia characterized by an inflammatory infiltrate in the connective tissue, and epithelial lesions that can cause dysplasia or metaplasia of the epithelial lining.
- Fig. 15 shows the microscopic appearance of a low-grade gastric dysplasia characterized by an inflammatory infiltrate in the connective tissue, and epithelial lesions that can cause dysplasia of the epithelial coating we see lymphocytes (the violated points and the glands change their shape and their number is decreasing).
- Fig. 16. Microscopic aspects of appendicitis: inflammation of the vermicular appendix, a small worm-shaped extension located at the end of the large intestine.

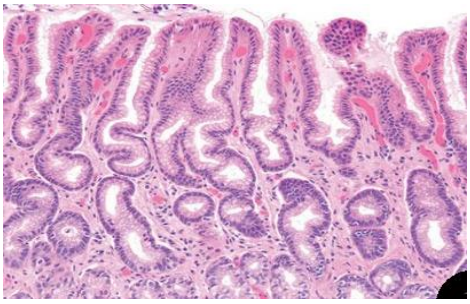

Fig. 12. Microscopic aspects of a healthy gastric mucosa (X40).

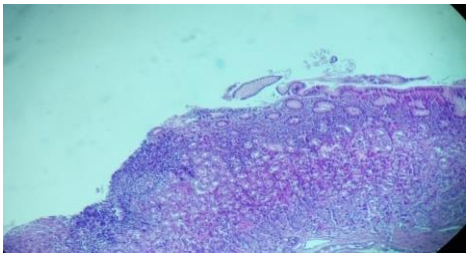

Fig. 13. The microscopic appearance of chronic atrophic gastritis (X40).

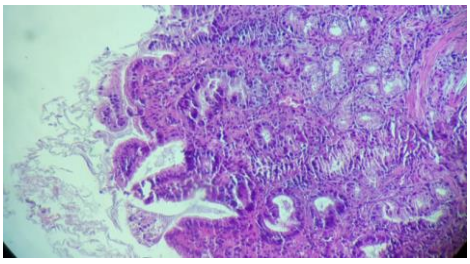

Fig. 14. Microscopic aspects of low grade gastric dysplasia (X40).

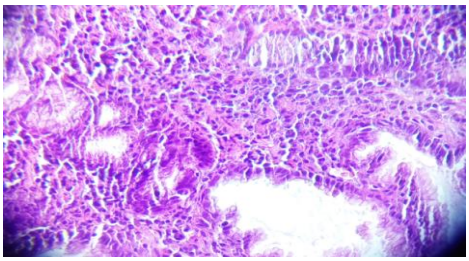

Fig. 15. Microscopic aspects of low grade gastric dysplasia (X100).

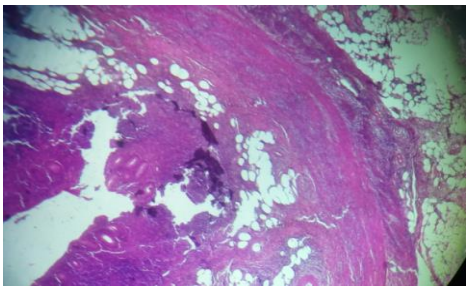

Fig. 16. Microscopic aspects of acute appendicitis (X40).

Discussion

Epidemiological and experimental studies show that environmental factors and diet play an important role in the etiology of digestive cancers. Over the past twenty years, numerous analytical epidemiological studies have attempted to determine which dietary factors are involved in digestive carcinogenesis.

The incidence rates between the different countries of the world, there are sometimes considerable differences. When subjects migrate from a low-risk country to a high-risk country, their cancer rate reaches that of the host country in one or two generations depending on the cancerous location (IARC, 2004).

Algeria is among the first countries in Africa and the Arab world to have a record number of people with cancer. In fact, it registers 30,000 new cases of different types of cancer annually, an increase of 50% compared to 2000 (Bouzid, 2002).

Our study involved a population of 1006 patients with digestive lesions during the period from 2014 to 2017 until the first month of 2018. The rate of lesions increases gradually each year.

The average age in our study is 31-40 years, which does not differ significantly from that confirmed in other studies (Perez Martinez *et al.*, 2005; Cynthia *et al.*, 2005; Ann *et al.*, 2002).

Several international studies have confirmed our results: Appendicitis is above all a disease of young people, rare in old people (Coulibaly, 1985; Silen, 1992; Valayer *et al.*, 1989).

Anal fissure occurs in all age groups and is particularly noticeable in young adults (Laurent *et al.*, 2008; Charles *et al.*, 2009). It is located in the age group of 31 - 43 years, which is the most affected in the literature (Laurent *et al.*, 2008).

With age, the strength of esophageal contractions and the tension of the upper esophageal sphincter decrease (a phenomenon called presbyesophagus), but the flow of food is not affected by these changes. However, many older people are likely to be affected by diseases that interfere with esophageal contraction (Charles *et al.*, 2009).

With age, too, the ability of the stomach lining to resist damage decreases, which in turn can increase the risk of peptic ulcer disease, especially in people who take aspirin or other nonsteroidal anti-inflammatory drugs (NSAIDs). Also with age, the stomach cannot accommodate as much food (due to decreased elasticity), and the rate at which it empties into the small intestine decreases. However, these changes usually do not cause any visible symptoms. Aging has little effect on the secretion of gastric juices, such as acid and pepsin, but disorders that can reduce acid secretion, such as atrophic gastritis, are becoming more common (Popat *et al.*, 2005).

Our results show that the rate of digestive pathologies is subdivided between men and women. In several studies, men were more represented than women with a sex ratio of 1.38 to 1.94. Gender is not a contributing factor (Perez Martinez *et al.*, 2005; Cynthia *et al.*, 2005; Parys and Reding, 1999).

In several series of studies, we have found many more men than women (Bakary, 1997; Denke, 2003; Ellen *et al.*, 2003), for others, there are as many men as women (Eduardo *et al.*, 2008), and another study confirmed a low rate of women (Ellen *et al.*, 2003).

The variation in the rates of digestive pathologies according to our study, there is a gradual increase in digestive lesions each year, note that there is a decrease during the first trimester of the year 2018.

Our results do not differ from that found in 2002 by Globocan which did a statistical study on the annual number of new cases of digestive cancers was 1,010,279 cases in men and 578,713 cases in women. Stomach cancer is one of the most common malignancies worldwide, with some 870,000 cases per year and 650,000 deaths. Developing countries record 60% of cases. The highest incidences are found in East Asia and the Andean regions of South America.

Our results show that there is variability in the distribution of lesions in patients depending on the organ of the digestive tract affected. The majority of lesions of the digestive tract are concentrated in the appendix (benign lesion).

Digestive pathologies are very frequent and affect both sexes indifferently; they mainly affect the digestive tract (the colon, the rectum, the stomach and much less the small intestine and the esophagus). Our results show that the benign lesions of the inflammatory and mechanical type represent a majority against the other types of lesions.

All digestive cancers were characterized by male predominance. The sex ratio calculated on the standardized incidence rates was high for esophageal cancer: 6.2 and primary liver cancer: 7.3. It was 1.6 for colorectal cancer and 2.6 for stomach cancer (Berrino *et al.*, 1999).

Digestive cancers in Algeria represent a quarter of cancers in general. Colon and rectal cancer lead the way with 8,500 cases recorded annually after lung cancer in men and breast cancer in women. Stomach cancer is ranked fourth with an annual average of 5,000 cases. Food plays an important role in the occurrence of digestive cancers through rapid industrialization where eating habits and sedentary lifestyles are constantly evolving (Oukkal, 2007).

Esophagus: we recorded a single case of the esophageal lesion during the year 2017, the incidence of adenocarcinomas, the risk factor of which is obesity and gastroesophageal reflux is increasing in the USA, where this histology represents half cases, then in Europe and France a quarter of cases in 2000 (Pera, 2000).

Stomach: chronic atrophic gastritis presenting the majority of stomach lesions (64.9%), not to mention the rate of interstitial gastritis which is remarkable (18.5%). According to Louvet *et al.* (2008), cancer of the stomach is the second most common cancer in the world, accounting for around 10% of cancer cases. For about forty years, we can observe a clear and general regression of this type of cancer in Europe and the United States in particular because of the modifications of the environment and the evolution of the habits of life (use of the refrigerator, increased vitamin consumption and improved water treatment).

Small intestine: duodenal atrophies are the most dominant type in the small intestine, followed by chronic duodenitis without forgetting the rate of intestinal inflammation. Malignant tumors of the small intestine are rare (2% of cancers of the digestive tract). They are 15 times less common than colon tumors (Cornet *et al.*, 1993; Perissat *et al.*, 1987).

Colon + Rectum: chronic colitis is the most dominant type of colon and rectum, followed by adenocarcinomas. In France, colorectal cancer is the most common cancer in the general population. Each year approximately 33,500 new cases are diagnosed, of which 21,500 (65%) are colonic cancers and 12,000 are rectal cancers (Gainant, 1993). Colorectal cancer is third cancer in incidence in France after prostate and breast cancer with more than 42,000 new cases per year, including 15,000 rectal cancers (Zuffereya *et al.*, 2005).

Appendix: it is always acute and the most frequent. The appendix is the most operated organ in abdominal surgery, but its function is not yet known (Chipponi, 1991). The incidence of appendicitis has been estimated at 100 cases per 100,000 inhabitants in Europe and North America (Ohmann *et al.*, 2002) 103/122 cases/100,000 inhabitants in Australia (Donnelly *et al.*, 2001), 18/100,000 inhabitants in Mali (Koumaré *et al.*, 1993).

Anus: hemorrhoids present the highest rate of anal pathologies, which is followed by anal fissures and then anal fistulas. Anal fistula (AF) ranks 3rd (13%) behind hemorrhoidal disease (50%) and anal fissure (20%) (Kouadio *et al.*, 1998).

Conclusion

Diseases of the digestive system form a set of acute and chronic conditions that vary greatly in terms of natural history, risk factors and prognosis. They can affect the digestive tract (from the oral cavity to the rectum), the peritoneum, as well as the liver, bile ducts and

pancreas. Among these conditions, some are both severe and relatively frequent, such as liver disease and chronic inflammatory bowel disease. Others are of lesser severity but can also significantly alter the quality of life of those affected (gastroesophageal reflux, functional intestinal disorders, etc.).

The pathologies described in this study are those classified in the chapter "Diseases of the digestive system" of the International Classification of Diseases (ICD, 10th edition). Digestive lesions, the prevention and management of which represent an important part of the activity of gastroenterologists, are frequent and can occur from birth to old age, these digestive pathologies affect men and women equally. The different types of digestive lesions recorded during this study during the years of 2014 until the first trimester of 2018 must be dealt with in a specific manner due to the often latent and atypical symptoms of the various pathologies. The standardized gerontological evaluation can then be useful both to estimate the prognosis of certain pathologies, but also to help clinicians make a diagnosis, since in our region of El-Tarf, the rate of these pathologies is increasing remarkable.

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