

Epidemiological Profile of Gastric Adenocarcinoma in Morocco: Evolution and Risk Factors

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Abstract

Background: Gastric cancer (GC) remains a public health issue despite the global incidence decrease over the last decades. GC is the third leading cause of cancer-related death worldwide and it is still of poor prognosis due to its late detection. This paper focuses on determining the sociodemographic and progressive characteristics of patients who presented gastric adenocarcinoma in the absence or in the presence of the bacterium *Helicobacter pylori* at the service of Hepato-Gastroenterology at the University Hospital of Rabat in Morocco. **Methods:** To evaluate the epidemiological characteristics of gastric adenocarcinoma in the absence or in the presence of the bacterium *Helicobacter pylori*, a retrospective study was conducted on cases admitted at the Hepato-Gastroenterology department (University Hospital, Avicene Rabat) between 2000 and 2010 to support gastric adenocarcinoma. **Results:** 240 cases of GC were recorded with an average of 22 cases per year, which represents 77% of all gastric cancers identified. Male gender is most affected. The frequency of appearance of ADK in the absence of the bacterium Hp is 82% (196 cases). It is 18% (44 cases) in the presence of Hp. During the study period, 99 deaths were recorded: 81 cases in the presence of the bacterium *Helicobacter pylori*, 18 cases of death in the absence of Hp. The lethality rate was higher in the male sex, either in the presence or absence of Hp. **Conclusions:** Management of GC additionally to early diagnosis represents effective preventive and therapeutic methods of GC.

Keywords: Epidemiology, Gastric adenocarcinoma, Retrospective, Risk Factors

Introduction

Gastric cancer (GC) remains a public health issue despite the global decrease in the incidence over the last decades. Approximately one million of new cases were diagnosed (6.8% of all cancers), making this digestive neoplasia the fifth most common malignancy and the third leading cause of cancer related-death in both genders worldwide (8.8% of the total) (Bachir et al., 2018). The risk is particularly higher in Eastern Asia where half of the world total occurs mainly in China and Japan. Although the African continent is considered as a low incidence area, 13,216 new cases of stomach cancer were diagnosed and 12,000 cases of death were recorded in 2012 (Ferlay et al., 2012).

The most common histologic entity of GC is adenocarcinoma, accounting for 90% of all stomach tumors (Carl-McGrath et al., 2008). Sixty percent to Seventy percent of GCs represent the final step of mucosal precancerous inflammatory process induced by *Helicobacter pylori* (HP) infection (Malfertheiner). The pre-neoplastic cascade is initiated by atrophic chronic gastritis (ACG) which may persist and advance to intestinal metaplasia when compared to dysplasia. ACG and IM are considered as reversible steps regressing by the bacterium eradication (Carl-McGrath, 2014; Correa & Piazuelo, 2013). Thus, this paper focuses on determining the sociodemographic and progressive characteristics of patients who presented gastric adenocarcinoma in the absence or in the presence of the bacterium *Helicobacter pylori*.

Materials and Methods

This is a descriptive retrospective study, during the period 2000 and 2010, which was conducted based on the records of patients in which their biopsies made during the examination of their stomachs by fibroscopy in the Department were consulted of Hepato-Gastroenterology at the University Hospital Center in Rabat, Morocco.

The statistical methodology was based on two axes:

- **Descriptive Statistics:** This involves the disengagement of frequencies and characteristics of each parameter studied. The results are expressed in raw values for the qualitative variables and in means \pm error of the mean for the quantitative variables.
- **Analytical Statistics:** The χ^2 test and the reduced gap calculation (ϵ) are used to determine whether a difference between some variables is significant. The calculation of the odds ratio (OR) informs us about the

liaison of the various factors with the evolution of the adenocarcinomatous patients. On the other hand, we detected the degree of association between the location of gastric cancer and the presence or absence of *Helicobacter pylori* (Hp) bacteria.

Results

During the study period, we collected 240 cases of gastric adenocarcinomas in the Hepato-Gastroenterology Department of Ibn Sina Hospital, Rabat Medicine Service B in Morocco. The average annual number of cases recorded was 22 cases per year, which represents 77% of all gastric cancers recorded. The frequency of appearance of ADK in the absence of the Hp bacterium shows that the years, 2001, 2008 and 2010, are the highest with 25, 28 and 25 cases respectively. This, however, is contrary to the year 2002 which reported too few with only 5 cases (Figure 1).

During the same study period, a total of 44 cases of Hp-associated ADK were recorded at the rate of 18%. The temporal distribution during collection years shows high peaks and low peaks (Figure 1).

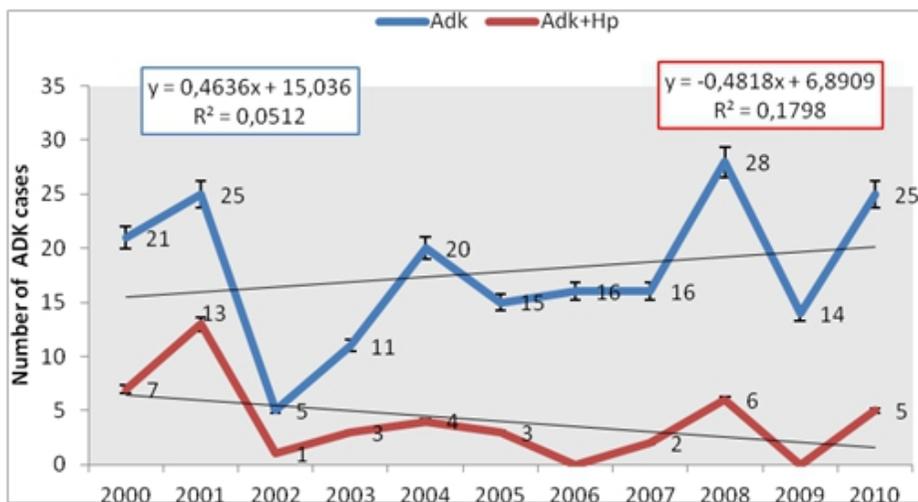


Figure 1. Temporal evolution of ADKs

According to the years of the 240 cases, 99 cases died (41% of the total patients). The average annual number of deaths is 9 ± 0.94 cases per year, with extremes ranging from 1 to 16 deaths. Figure 2 illustrates the annual distribution of the number of deaths of ADK in the presence (81 cases of death) and in the absence of the bacterium *Helicobacter pylori* (18 cases of death).

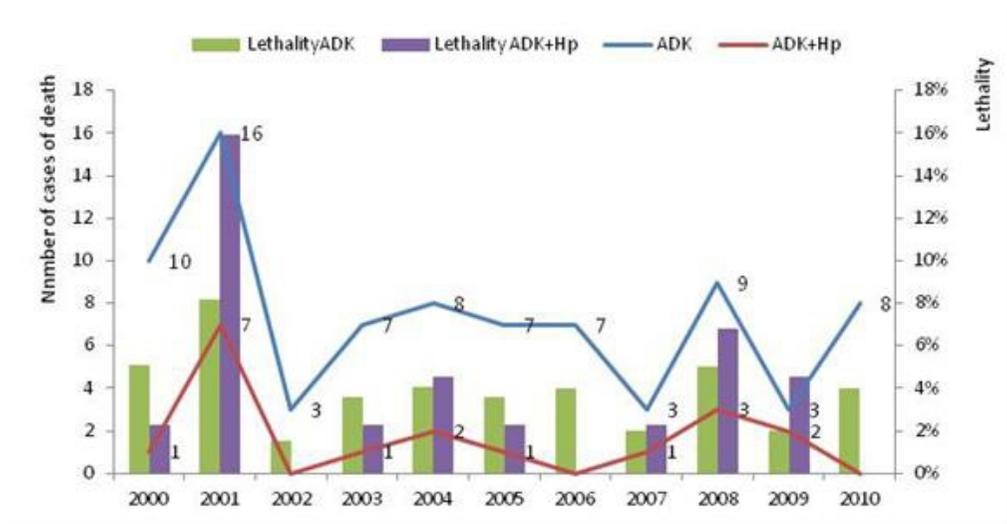


Figure 2. Annual distribution of deaths and case lethality rate

Furthermore, the distribution of cases of ADK deaths, not associated with *Helicobacter pylori* infection by sex, shows that 48 cases of death were male (59%) and 33 cases (41%) were female (Table 1) with a sex ratio (M/F) of 1.2 ($\chi^2 = 2.78, p = 0.09$). The highest case lethality rate was observed in males at 24%, compared with 17% for females. The difference is not significant between the two sexes in terms of lethality ($\epsilon = 1.2$).

Similarly for patients who developed an ADK associated with *Helicobacter pylori* infection, it was shown that 10 deceased cases are male with a frequency of 55% and 8 of them are female which is 45% ($\chi^2 = 0.22; = 0.6$). Similarly, the case lethality rate is higher in the male sex with 23% compared to 18% in the female sex. The difference is not significant ($\epsilon = 0.26$) in terms of lethality between the two sexes.

Indeed, the highest frequency of patients who have died from this type of cancer is aged 60 to 79, either in the absence or in the presence of the bacterium *Helicobacter pylori* with a case-fatality rate of 28% (n = 68 cases). This was followed by the 50-59 age group, with a case-lethality rate of 9% (n = 21 cases), and then the age of 80 or older with a case-fatality rate of 4% (n = 10 cases) (Table 1).

Table 1. Epidemiological characteristics of deceased patients

Variable	ADK	ADK+Hp	Lethality ADK (%)	Lethality ADK+Hp(%)
Gender				
Female	23	8	12	18
Male	58	10	30	23
Total	81	18		
Age group				
[50-60[	17	4	9	20
[60-70[	26	8	13	18

[70-80[	28	6	14	14
>=80	10	-	5	-
Total	81	18		

Furthermore, we studied the effect of certain factors on the evolution of patients. The independence test χ^2 and the Odds Ratio are calculated to identify the risk factors that would have affected the progression of the state of health of adenocarcinomatous patients in our series. Table 2 mentions the analysis of the association between evolution and the socio-epidemiological and evolutionary parameters that were studied.

Table 2. Risk factors that influence the evolution of patients

Associated factor	Favorable	Death	χ^2 to 1 ^{ddl}	p	OR	CI to 95 %
Sex						
Female	66	41	0,69	NS	0,8	0,48-1,34
Male	75	58			1,24	0,74-2,08
Total	141	99				
Age group (Years)						
[10-20[-					
[20-30[	6	-			-	
[30-40[	14	-			-	
[40-50[	37	-			-	
[50-60[	37	18	2,14	NS	0,62	0,33-1,17
[60-70[	35	37	4,36	S	1,81	1,04-3,16
[70-80[	9	34	30,92	HS	7,67	3,47-16,94
≥80	3	10	8,35	VS	5,75	1,54-21,51
Total	141	99				
Toxic habits						
Alcohol	1	1	0,02	NS	1,25	0,08-20,69
Tobacco	20	18	1,66	NS	1,75	0,75-4,11
Alcohol +Tobacco	21	13	0,94	NS	0,64	0,26-1,56
Non-Steroidal Anti-Inflammatories	3	5	1,08	NS	2,19	0,49-9,85
Plant	0	1	1,26	NS	-	-
Total	45	37				
H.pylori						
Hp+	26	18	1,33	NS	0,68	0,35-1,32
Hp-	97	99			1,47	0,76-2,85
Total	123	117				
NS : No significant liaison -S : Significant liaison -VS : Very significant -HS : Highly significant liaison- Hp+ : Presence of helicobacter pylori, Hp- : Absence of helicobacter pylori						

The studied variables include Sex, age group, toxic habits, presence of helicobacter pylori (Hp +), and absence of helicobacter pylori (Hp-). The sex of the patients did not have a significant association with the death. Patients over the age of 60 have shown a risk of progression to death. This risk is

accentuated in the older group of 60-70 years (OR = 7.67 to 95% CI [3.47-16.94]), as well as those aged 80 years and above (OR = 5.75 at CI at 95% [1.54-21.51]). Adenocarcinomatous patients with toxic habits such as alcohol, tobacco, alcohol + tobacco, plants, and Non-Steroidal Anti-Inflammatories did not mount a significant association with the development of the disease. According to the results of Table 2, no risk was shown in the absence or presence of the Hp bacteria.

On the other hand, we have studied the influence of Hp on the localization of gastric adenocarcinoma (Table 3). According to the results of Table 3, there is no significant difference between the presence or absence of the bacterium Hp and the different localizations studied.

Table 3. Distribution of odds ratio for the location according to the presence or absence of Hp

Localization	Antral	χ^2	P	OR	CI to 95%
n (Hp+)	29	2,78	0,09	1,78	0,9-3,52
n (Hp-)	102			0,56	0,28-1,11
	Cardia				
n (Hp+)	1	4,34	0,03	0,15	0,02-1,15
n (Hp-)	26			6,57	0,86-49,8
	Fundus				
n (Hp+)	9	0,02	0,89	0,94	0,42-2,11
n (Hp-)	42			1,06	0,47-2,38
	Pangastrique				
n (Hp+)	5	0,12	0,73	0,83	0,30-2,32
n (Hp-)	26			1,19	0,43-3,30

Hp+: presence of helicobacter pylori, Hp- : absence of helicobacter pylori

Discussion

Stomach cancer is essentially represented by gastric adenocarcinomas, which remains one of the top ten global causes of mortality with a prognosis that is pejorative. They are about 90% of cases where adenocarcinoma was developed at the expense of the gastric epithelium. Other tumors are lymphoma (5%), neuroendocrine tumors, and stromal tumors (Gallo & Cha, 2006). Gastric adenocarcinoma remains one of the top 10 global causes of cancer-related mortality due to poor prognosis (Aparicio et al., 2004).

It is a cancer with variable incidence worldwide, the highest in East Asia (Japan, China and Korea), and 102,040 new cases were reported in Japan in 2008 (Yingsong et al., 2011). A total of 240 cases of ADK were collected during the study period, with an annual average of 22 cases / year, which represents 77% of all gastric cancers identified. In other works, the ADK represented a frequency of 70.1 to 100% (Ayite et al., 2004; Biffi et al., 2010), which confirms our results. During the study period, 99 cases of death were recorded at a rate of 41%. This result is similar with the literature (Bouglouga et al., 2011) which is of the order of 40%. The average age of patients is $59 \pm$

0.93 years, with a minimum age of 22 years and a maximum age of 90 years, which seems consistent with other publications (Luis et al., 2007; Ilter et al., 2010).

The frequency of this cancerous pathology is twice as high in males (63.77%) as in females, with a highly significant difference ($p < 0.001$) according to our study. This situation is similar to other results whose sex ratio was $M F = 2$ (Aparicio et al., 2004).

High male risk is related to more frequent toxic habits in men and, in the majority of cases, it is related to smoking and / or alcoholism, occupational exposure, and environmental and carcinogenic substances (Neuberger et al., 2006; Martinez et al., 2005).

According to our study, the frequency of the association of *Helicobacter pylori* with the presence of gastric adenocarcinomas is 18%. In other studies, the frequency of *Helicobacter pylori* is about 15% (Enneddam, 2008).

Several environmental factors, genetic, and a number of conditions have been incriminated as etiopathogenic factors in the occurrence of gastric cancer.

Smoking has been shown to induce gastric cancer and was classified by the International Cancer Research Agency as a group 1 gastric carcinogen. In our study, no significant difference was found between smoking and the occurrence of ADK ($p > 0.05$), which is consistent with a German study (Bornschein et al., 2011). Similarly, nonsteroidal anti-inflammatory drugs have no significant effect on the development of ADK according to our study. In other work, these anti-inflammatories have an effect on carcinogenicity (Glehen et al., 2000).

On the other hand, in our study, alcohol represents 3% of all toxic habits. In other publications, the concept of alcoholism was found in 2.79% of patients (Salmi, 1995). This discrepancy is due to the number of cases collected from one study to another. However, in all cases, studies have shown that there is no obvious relationship in the occurrence of gastric ADK and alcohol consumption (Aparicio et al., 2004), which is consistent with our results. The gastric cancers sit more frequently in the zones of mucous junction in the prepyloric region, in the antrum, and in the small curvature. The antral location represents 60%. This percentage matches that of our study which was 55%. In other works, it is respectively 50.3%, 50%, and 52% (Glehenal, 2000; Marcato, 2007; Nakamura et al., 2002).

Conclusion

Gastric cancer is a real health problem. Hence, there is the need to organize information and education campaigns in order to encourage people

to consult early on functional signs and to treat patients early in order to control the disease and avoid deadly results.

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