

## Celiac Disease: A Challenging Disease Uneasy to Diagnose in Sub-Saharan Africa

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### ABSTRACT

**AIM:** Celiac disease is rarely described in sub-Saharan Africa.

**METHODS:** From a series of 17 cases diagnosed between 2005 and 2007 in Djibouti, we describe our diagnosis and management difficulties.

**RESULTS:** African ethnics represented 64.7%. Sex ratio (F/M) is 1.4, mean age 82 months, associated diseases in 47%. Anti-gliadine, anti-endomysium and anti-transglutaminase antibodies were positive in 100%, 66.6% and 100%. Upper digestive tract endoscopy was realized 4 times. Eleven patients (64.7%) began gluten free diet, 7 recovered. Two patients died (11.7%).

**CONCLUSION:** CD is difficult to diagnose for technical reasons. GFD is successful thanks to parental continuous medical education.

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**Key words:** Celiac disease; Gluten; Djibouti; Eastern Africa

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### INTRODUCTION

Celiac disease (CD) is well known in developed countries and, although more and more often described in northern Africa<sup>[1]</sup>, is rarely described in sub-Saharan areas<sup>[2,3,4,5]</sup>. From a series of 17 Djiboutian patients, we try to build a diagnosis algorithm adapted inter-tropical Africa.

### METHODS

Between August 2005 and August 2007, we prospectively registered all cases of celiac disease admitted in Medicine Unit in Bouffard French Military Hospital in Djibouti (Republic of Djibouti, Horn of Africa). This hospital is located in the town of Djibouti and is opened to french military families and local population through cooperation convention (Djiboutian soldiers' families), free medical aid (allowed by French Forces Sanitary Service) and through adapted or full charges (based on French sanitary system charges). In selected patients with digestive complaints or malnutrition assessed by WHO 95327 weight curves adapted to developing countries, inclusion criteria were seropositivity for gliadine and/or endomysium and/or transglutaminase antibodies. Basic blood analyses were carried out in Bouffard hospital laboratory. Serologic analyses were sent by plane to Val de Grace French military hospital laboratory in Paris. If possible, anti-gliadine (IgA, IgG) (Elisa Bioadvance™, threshold >100 UR/mL before 4 years old, >50 UR/mL after 4 years old), anti-endomysium (IFI Bioadvance™, threshold=1/10, The Binding Site™, threshold=10U/mL) and anti-transglutaminase antibodies (IgA, IgG) (Elisa The Binding site™, threshold=10 U/mL) were coupled. Upper digestive tract endoscopies (Olympus™ GIF XQ40 gastroscope) were realized by one operator (TC) in Bouffard hospital sometimes under general anesthesia. Duodenal biopsies, practiced with single use biopsy forceps Cook™ without methylene blue coloration, were fixed in F2A and sent by plane to the Military Teaching Hospital Laveran Pathology Unit in Marseilles (France). MGG coloration was used for pathological examination. Gluten free diet (GFD) clinical response was assessed clinically, serologically and pathologically if possible.

### RESULTS

Seventeen patients were included (10 females and 7 males; mean age 82 months (9-276). Malnutrition was constant (100%) and associated with digestive complaints (abdominal pains, bloating, chronic diarrhea) in 15/17 patients (88%). Eight patients (47%) had associated diseases: pulmonary tuberculosis (2; 11.2%) or distal gastric adenocarcinoma, giardiasis, taeniasis, oral candidosis, Klebsiella pneumonia septicemia, cytomegalovirus primo-infection and urinary infection (all 1; 5.9%). Anti-gliadine, anti-endomysium and anti-transglutaminase were positive in the 16/16 patients (100%), 10/15

Table 1 17 patients characteristics.

Patient	Gender	Clinics	Clinical examination	Associated diseases	Histology	Serology	Evolution
1	girl	Anorexia, chronic vomiting since 5 years	Low weight (10.7 kg)	none	No	AEA 1/320 AGA IgA>200 UR/mL IgG>200 UR/mL	No GFD Lost of follow up
2	boy	Chronic diarrhoea General status impairment	BMI=12 Ankle oedema, ascitis	none	Total villous atrophy Intra-epithelial lymphocytosis	AEA 1/640 AGA IgA>200 (N<10) IgG>200 (N<10) AEA= 80 (N<10)	GFD+3 kg; Antibodies titers decrease Villous atrophy partial correction at 1 year
3	girl	Chronic diarrhoea, weight loss (-50%)	Cachexia (6.5 kg) meteorism	Taeniasis	No	AGA IgA=10 (N<5) IgG=31 (N<10) ATGA>100 (N<10)	GFD Asymptomatic and+8kg on month 18
4	girl	Caught Weight loss (-50% in 4 months)	Low weight (8 kg) Polyadénopathy	Pulmonary tuberculosis	No	AGA IgA=33 (N<5) IgG=93 (N<10) ATGA=39 (N<10)	GFD +5.4 kg in 18 months After tuberculosis treatment despite GFD inobservance
5	boy	Chronic diarrhoea and vomiting since 8 months	Low weight (10.5 kg)	Oral candidosis	No	AEA >320 (N<10) AGA IgA=19 (N<5) IgG=76 (N<10)	Lost of follow up
6	girl	Chronic vomiting since 3 years	BMI=9.8 meteorism		Total villous atrophy Intra-epithelial lymphocytosis	AGA IgA=104 UR/mL IgG>200 UR/mL	GFD +1.7kg in 2 months
7	woman	General status impairment	Cachexia (22 kg)	E. Coli urinary infection CMV primo-infection	No villous atrophy nor intra-epithelial lymphocytosis	AEA<10 (N<10) AGA IgA=20 (N<5) IgG=13 (N<10)	No GFD Death after 3 months (multiorgan failure)
8	man	Chronic vomiting, general status impairment	Cachexia (34 kg)	Occlusive gastric antral adenocarcinoma	No	AEA <10 (N<10) AGA IgA=110UR/mL IgG>200UR/mL AEA=0	Partial gastrectomy then GFD Death on month 6 (peritoneal carcinomatosis)
9	girl	Denutrition, dehydration	Cachexia (5.3 kg) Meteorism	Klebsiella Pneumoniae septicemia	No	AGA IgA>200 UR/mL IgG>200 UR/mL	GFD Lost of follow up
10	girl	Chronic diarrhoea	Cachexia (6.8 kg)		No	AEA= 80 (N<10)	GFD +1.7 kg on month 2 Then recurrence due to GFD interruption
11	Boy	Chronic abdominal pain and diarrhoea	Low weight (15.5 kg) meteorism		No	AEA>1/1280 (N<1/10) AGA IgA>200 UR/mL IgG>200UR/mL (N<25)	GFD +200 g on month 2
12	girl	Caught, diarrhoea, general status impairment	Low weight (7 kg) Ankle oedema Meteorism	Pulmonary tuberculosis	No	AEA=1/80 (N<10) AGA IgA=180 UR/mL IgG=60 UR/mL (N<50)	GFD+tuberculosis treatment Lost of follow up
13	boy	Vomiting, diarrhoea since 2 months	Low weight (9.7 kg) Ankle oedema		No	AEA= 1/160 (N<1/10) AGA (n<50) IgA>200 UR/mL IgG>200 UR/mL	GFD Lost of follow up
14	boy	Chronic diarrhoea and abdominal pain (years)	Low weight (28.5 kg) Meteorism		No	AEA= 1/320 (N<1/10) AGA IgA= 80 UR/mL IgG= 180 UR/mL (N<25)	GFD +1.5 kg and asymptomatic on month 6
15	girl	Chronic diarrhoea, general status impairment	Low weight		No	AEA=0 AGA IgA>200 UR/mL IgG >200 UR/mL (N<25)	No GFD Lost of follow up
16	girl	Vomiting, diarrhoea since 1 month	Normal examination	Giardiasis	No	AEA=0 AGA IgA<25 UR/mL IgG=130 UR/mL (N<50) ATGA=73 U/mL (N<7)	Lost of follow up
17	boy	Chronic diarrhoea since 3 yeras	Low weight (11.3kg) Meteorism		No	AEA= 1/160 AGA IgA=135 UR/mL IgG=100UR/mL (N<50 UR/mL)	No GFD Lost of follow up

AEA: anti-endomysium antibodies; AGA: anti-gliadin antibodies; ATGA: anti-transglutaminase antibodies; GFD: gluten free diet.

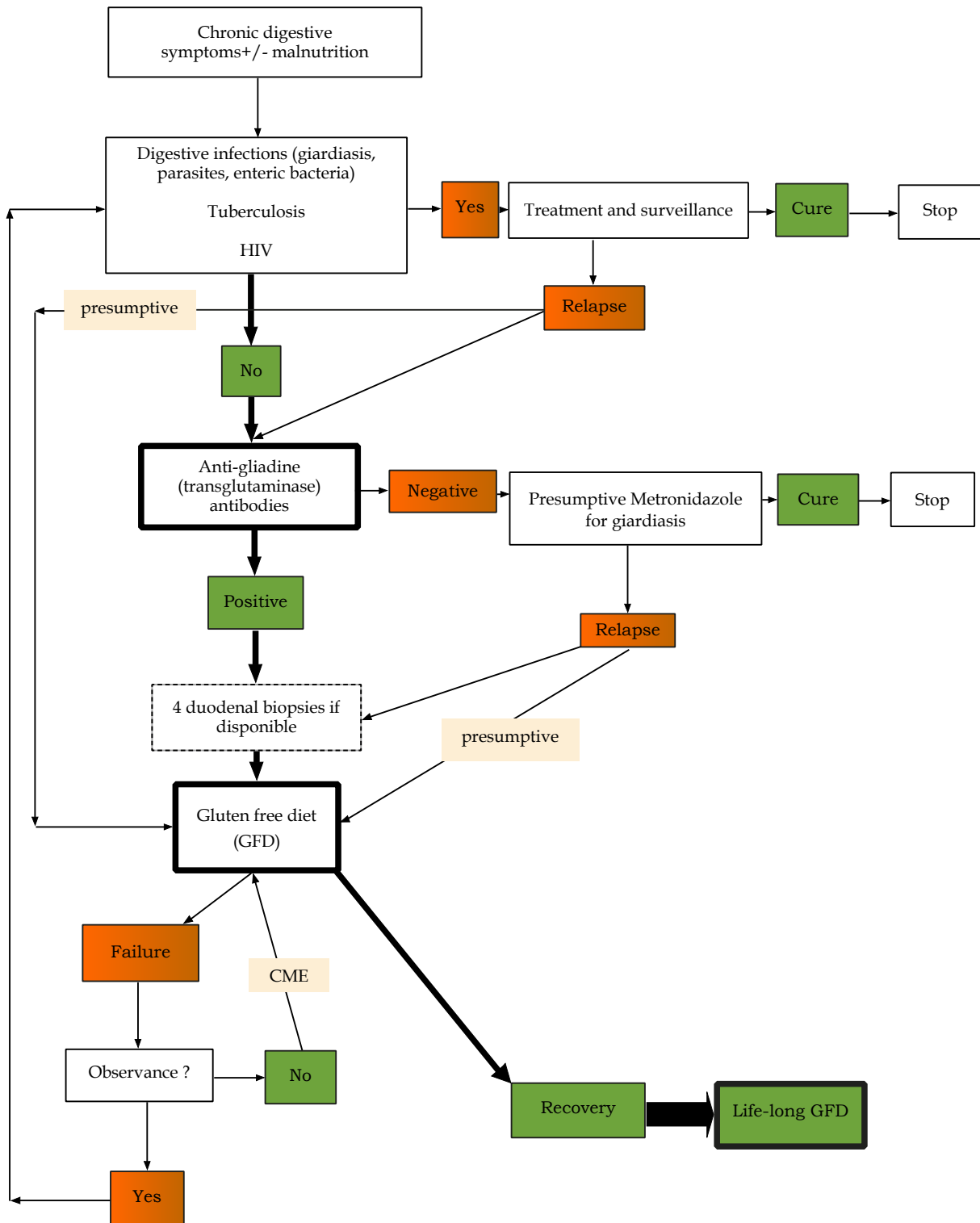


Figure 1 Celiac disease diagnosis algorithm in sub-Saharan Africa.

patients (66.6%), in 3/3 patients (100%) respectively. Upper digestive tract endoscopy was realized in 4/17 patients (23.5%) and duodenal biopsies in 3: total villous atrophy with raised intra-epithelial lymphocytosis twice (66.6%) (stage IV in Marsh classification) and once normal (33.3%).

GFD was introduced in 11/17 (64.7%) with clinical follow up in 9 (52.9%). Mean follow-up was 9 months (2-18 months). Two patients died during this period (11.7%).

Partial weight recovery under GFD was observed in 7/9 followed patients; mean weight gain was 3.1 kilograms (0.2-5.4 kg). Gluten free diet observance was poor in two patients who clinically relapsed.

## DISCUSSION

CD is unknown because rarely reported in inter-tropical Africa<sup>[2,3,4,5]</sup>. So we recorded it in Eastern-Africa in Djibouti during two years. Our study population reflects Djibouti ethnics repartition and our

hospital specific recruitment (pediatrics and adults from middle and high class). In this population, dietary habits differ from general population with large use of bread, biscuit, noodles and sweets. Some particularities must be underline. Confounding associated diseases were present in 41.2%. Even realized through optimized technical conditions in Bouffard French military hospital, our study highlights the low availability of endoscopy and pathological analysis which cannot be systematically recommended in Africa. It also focuses on the high diagnosis performance of anti-gliadin (46.8€) or anti-transglutaminase (70.2€) serology (to be preferred) and the low sensitivity of anti-endomysium (81.9€) antibodies (66.6%)<sup>[6]</sup>. Eleven patients (64.7%) began GFD which is quite easy to manage in inter-tropical Africa even presumptively when diagnosis means lack: in Djibouti, we excluded bread, biscuits, semolina and noodles and use rice extensively. In Western Africa, substitution seems easier because sorghum, wood-millet or cassava are traditionally widely used<sup>[7]</sup>. GFD is effective as illustrated by our 77.8% recovery rate. The main reason of regimen's failure is misunderstanding of this life-long regime benefits by parents who need continuing medical education with the help of health care workers. Our mortality rate (11.7%) is twice Turkish hospitalized CD<sup>[1]</sup> probably linked to late diagnosis.

## CONCLUSION

Celiac disease does exist in sub-Saharan Africa especially in Djibouti, where it emerges in middle and high-class population because massive gluten introduction in food. The lack of awareness and diagnosis means, the association with confounding affections to treat before, explain its ignorance. In this specific situation, GFD can be introduced presumptively because it is simple to manage in sub Saharan Africa and is not expansive. Continuing parental education on the aim of GFD is the way of success. We, therefore, propose a

celiac disease diagnosis algorithm adapted to sub-Saharan African (figure 1)

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