



# Liver Abscess in Diabetic Patients: A Case Series

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## Abstract

Liver abscess is defined as a pus heap in a newly formed cavity at the expense of surrounding liver tissue which gets destroyed or repressed. It is a rare and serious infection. The aim of our survey is to report the clinical characteristics as well as biological, imagery and therapeutic ones of liver abscesses in diabetic patients. It is a descriptive and analytical survey including all diabetic patients followed in the Endocrinology and Diabetology Department of Ibn Rochd University Hospital of Casablanca with liver abscess from March 2013 till March 2016. The studied variables concern mainly age, gender, diabetes type, glycated hemoglobin (HbA<sub>1c</sub>), clinical signs, isolated germ and treatment.

During the studied period, 11 patients were followed for liver abscesses. They were two women and nine men. Mean age was  $49 \pm 11$  years. They were all in poor glycemic control and admitted in ketosis with fever. Clinical exam did not lead to any infections focus. The assessment indicated leukocytosis with neutrophil predominance and an increase in C-reactive protein. Due to the persistence of general condition alteration of the patients, an abdominal ultrasound was performed in all patients and revealed hypoechogenous images in relation with liver abscesses confirmed by abdominal tomodensitometry.

The bacteriological/parasitological exam detected *Klebsiella pneumoniae* in five cases, *Escherichia coli* in two cases, *Entamoeba histolytica* in two cases and was sterile in two cases. The patients underwent intensified insulin therapy, empiric intravenous antibiotic therapy and were then adapted according to the results of antibiogram. Five patients underwent surgical drainage and two patients ultrasound guided drainage. Evolution was favorable in all patients. Liver abscesses in diabetic patients are pauci-symptomatic. It should be then considered in case of unfavorable evolution of acute decompensation despite a well conducted therapy when patients have a chronic poor glycemic control.

**Keywords:** Diabetes-liver abscess-poor; Glycemic control-infection; Pauci-symptomatic

## Introduction

Liver abscess is defined as a pus heap in a newly formed cavity at the expense of surrounding liver tissue which gets destroyed or repressed [1]. Bacterial liver abscesses prevalence varies from 0.29 to 1.47% in autopsies series and from 0.008 to 0.16% in hospitalized patients [2]. In certain cases liver amoebic abscesses can complicate intestinal amoeba in 3 to 9% of cases [3]. Diabetic patients seem to be the most favorable to liver abscesses with 3.5 fold relative risk [1]. Clinical manifestation is pauci-symptomatic and no specific. Germs can be bacterial, parasitic or fungal. It is a rare and serious infection. Treatment is based on empiric antibiotic therapy adapted to antibiogram and draining according to cases.

The aim of our survey is to report the clinical, biological and imagery characteristics of liver abscesses in diabetic patients.

## Patients and Methods

It is a descriptive and analytical survey including all diabetic patients followed in the Endocrinology and Diabetology Department of Ibn Rochd University Hospital of Casablanca with liver abscess from March 2013 until March 2016. Liver abscess diagnosis was maintained in case of an evoking hypoechogenous mass at the hepatic ultrasound. The studied variables concern mainly age, gender, type of diabetes, glycated hemoglobin (well glycemic control: HbA<sub>1c</sub> <7%, poor glycemic control: HbA<sub>1c</sub> >7%), clinical signs, isolated germ, treatment and evolution were excluded any patient who refuses to provide the information.

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**Table 1:** Patients Features.

Patients	Sex	Age (years)	Type of diabetes	Diabete seniority (year)	HbA <sub>1c</sub>	Localization/abscess size	Agent	Treatment
1	M	49	2	0	9,27%	segments VI-VII/ larger size: 7,1'8,1'4,1cm	<i>K.pneumoniae</i>	Drainage and antibiotic
2	M	32	1	10	11,8%	Multifocal/ larger size: 6,41'5,17 cm	sterile	ultrasound guided drainage and antibiotic
3	M	65	2	0	12,4%	Multifocal/larger size: 3,4'2,98'1,6 cm	<i>K.pneumoniae</i>	antibiotic
4	M	54	2	6	9%	segments VI-VIII/ larger size: 16,3'10,2'12,7 cm	<i>K.pneumoniae</i>	Drainage and antibiotic
5	F	47	2	5	12%	Segment VII/ larger size: 3,8'4,3'2,7cm	<i>Escherichia. coli</i>	antibiotic
6	M	52	2	6	8,1%	Multifocal/larger size : 10,99'3,95cm	<i>E.hystolytica</i>	Drainage and metronidazole
7	M	63	2	11	10,6%	Multifocal/ larger size: 5,3'5'4,6cm	<i>K.pneumoniae</i>	antibiotic
8	F	49	2	4	9,8%	Segments VIII/ larger size: 7,4'6,6'8,7cm	<i>Escherichia. coli</i>	ultrasound guided drainage and antibiotic
9	M	55	2	1	11,3%	Multifocal/larger size: 9,8'6,2'4,5cm	sterile	Drainage and antibiotic
10	M	27	1	3	10,2%	segments VI-VII/ larger size: 5,3'4,2'4,8cm	<i>K.pneumoniae</i>	antibiotic
11	M	48	2	5	12,4%	Segment VII/ larger size: 8,4'7,4'5,1cm	<i>E.hystolytica</i>	Drainage and Metronidazole

**Abbreviations:** M=Male; F=Female; K= Klebsiella; E= Entamoeba; HbA<sub>1c</sub>= Glycated haemoglobin

## Results

### Epidemiological features

In all, 1702 patients were hospitalized for diabetes which 11 followed for liver abscesses. Prevalence was 0.6%. They were two women and nine men. Mean age was 49 ± 11 years with a mean history of 4.6 ± 3.6 years. Nine patients had type 2 diabetes and two patients had type 1 diabetes. They were all in poor glycemic control with mean glycated haemoglobin of 10.6 ± 1.4%. The (Table 1) illustrates the patients features.

### Clinical features

Patients were all admitted in ketosis with fever, general condition alteration and no abdomen pain. Clinical exam did not lead to any infection focus except in two patients who showed diffuse abdominal sensitivity at examination.

### Biological characteristics and imagery

Initial assessment indicated leukocytosis with neutrophil predominance and a mean rate of 24200 elements/mm<sup>3</sup>, an increase in C-reactive protein (CRP) of 188 mg/l. Liver transaminases were raised in three patients less than two folds the upper normal limit. Blood culture was negative in 8 cases and positive in three patients (*K. pneumoniae*: 2 cases, *E. coli*: 1 case).

Due to the persistence of general condition alteration, an abdominal ultrasound was performed and revealed hypoechogenous images in relation with liver abscesses confirmed by abdominal tomodensitometry. The liver abscess was unifocal in six cases (Figure 1) and multifocal in five patients (Figure 2). Average size of the abscesses was 7.9 ± 3.6 cm. We noticed existence of gallstones in two cases. Furthermore prostatic abscess and right renal abscess were also identified in one patient.

Bacteriological/parasitological exam of the pus detected *K. pneumoniae* in five cases, *E. coli* in two cases, *E. hystolytica* in one case. Retroviral infection (HIV) serology, hepatitis (A, B and C), hydatid and amoebic serology ones were negative in ten cases and positive (amoebic serology) in one patient.

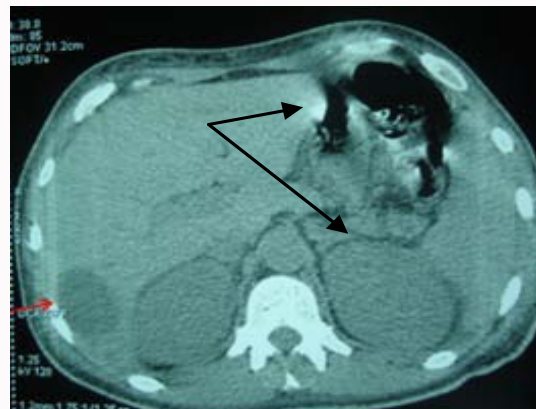
### Treatment

Patients underwent intensified insulin therapy, empiric

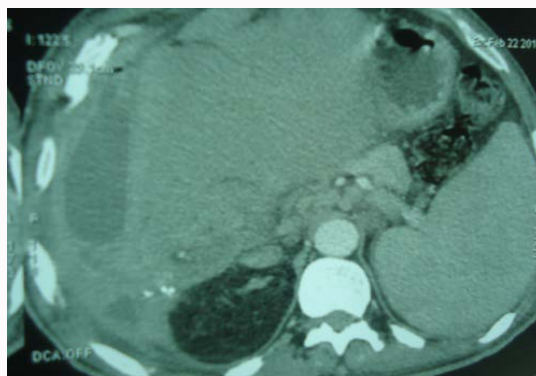
intravenous antibiotic therapy based on ceftriaxone, gentamycin and metronidazole, then adapted according to the results of antibiogram. Treatment duration was maintained during 4 to 6 weeks by intravenous way. Five patients underwent surgical drainage and two patients ultrasound guided drainage.

### Evolution

It was favorable in all patients and an average length of hospital stay was forty five days.



**Figure 1:** Unifocal Liver Abscess.



**Figure 2:** Multifocal Liver Abscess.

## Discussion

Patients mean age in our study was  $49 \pm 11$  years. This result is close to the affirmation of Chagneau-Derrode et al. [4] who said that the peak incidence of bacterial liver abscess was between 60 and 70 years. Likewise we noted the male predominance which was found by Lin et al. [5] and Wang et al. [6].

Those found that gallstones, intra-abdominal infections, digestive surgery and pathologies leading to the immunosuppression including diabetes can lead to pyogenic liver abscess [7,8]. In our series, diabetes and two cases of gallstones were found. It was described that leukocyte adherence, chemotaxis, phagocytosis and antioxidant systems involved in bactericidal activity may be impaired in diabetic patients [5].

It appears that our patients' clinical features were insidious and no specific and only imagery (ultrasound and tomodesitometry) led to diagnosis. Thus we need to realize the importance of an abdominal ultrasound in every febrile diabetic patient with no evident clinical focus.

Bacteriologically, in more than 2/3 of the cases, the germ was identified in the liver abscess via pus exam or hemoculture [9]. *E. coli* was the main germ identified in the liver abscesses till 1980 when several studies started to report *K. pneumoniae* predominance (50 to 80%) in several countries. It is also what has been reported in several Asian studies mainly in Taiwan and Korea [5,6]. In our series, we also noticed the predominance of *K. pneumoniae* (five cases) followed by *E. coli* (two cases) and *E. histolytica* (two cases). Diabetes is known as the main risk factor of liver abscesses with *K. pneumoniae* [6,10]. Thus, 25% of the patients with liver abscesses with *K. pneumoniae* were diagnosed for the first time for diabetes according to Yi-Tsung Lin et al. [5]. The serotype was not sought in our patients but in literature, there are K1 and K2 serotypes which are predominant.

Patients with poor glycemic control are more exposed to have complications such as liver veins thrombophlebitis, gangrene and spreading to other organs especially eyes, brain, urinary tract and lungs when causative agent is *K. pneumoniae* [5,11]. One of our patients showed a prostatic abscess combined to a right renal abscess that might be metastases from liver abscess with *K. pneumoniae*.

Therapeutically, concerning the draining of the liver abscess, there are no consensual recommendations. However, we know that antibiotic therapy alone is effective when the size of the abscess is lower than 3-5 cm. In an investigation involving 107 patients with liver abscess, Hope et al. [12] described a 100% success ratio when antibiotic therapy alone was carried out to treat unilocular liver abscess of less than 3 cm. The same was for 465 abscesses of which 176 liver abscesses in a study by Bamberger [13], therapeutic success rate was more than 80% by using antibiotic therapy alone when liver abscesses size is lower than 5 cm. According to the size of the abscesses, five patients underwent laparotomy drainage and two patients had ultrasound guided drainage.

In general, the empirical antibiotic therapy takes into considerations agents that are potentially responsible like aerobic gram-negative bacteria and *streptococcus*. Combination of amoxicillin with clavulanic acid or third generation cephalosporine or piperacillin or tazobactam with aminoglycoside (gentamycin) are thus used empirically; metronidazole can be associated if the selected antibiotic is not active on the anaerobics or in case of doubt with

amoebic abscess. The length of the antibiotic therapy generally varies from 3 weeks to 6 weeks [7,12,13]. In case of confirmed amoebic abscess, metronidazole is the favorite therapy. It is 1.5 to 2 g/day orally or intravenously for 10 days. Tinidazole or ornidazole in 1.5g/day for 5 days can be an alternative. The therapy is completed by a cure of contact amoebicide: tiliquinol, tilbroquinol (four tablets/day for 10 days) [14].

The long-term hospitalization in our series could be explained by the poor glycemic control noted in all patients. So in diabetic patients with sepsis, Gornik et al. [15] demonstrated that  $HbA_{1c}$  is an independent prognostic factor for hospital mortality and length of stay. Hyperglycaemia influences via advanced glycation end products (AGE) numerous physiological processes important in systemic inflammatory response and sepsis. AGE receptors have also been shown to negatively influence outcome of sepsis in animal model [16].

Mortality is high in diabetic patients and varies from 1% to 31% for pyogenic abscesses [17-20]. It is half reduced for the amoebic abscesses [2].

## Conclusion

Liver abscesses in diabetic patients are pauci-symptomatic. Contrast between clinical and imagery is noticeable. It should be then considered in case of unfavorable evolution of acute decompensation despite a well conducted therapy when patient had a chronic poor glycemic control. Treatment goes through empirical antibiotic therapy adapted to antibiogram and draining according to abscesses sizes.

## References

- Chiche L, Dargère S, Le Pennec V, Dufay C, Alkofer B. Abscès à pyogènes du foie. Diagnostic et prise en charge. Gastroentérologie Clinique et Biologique. 2008; 32: 1077-1091.
- Greenstein AJ, Sachar DB. Pyogenic and amoebic abscesses of the liver. Seminars in liver disease. 1988; 8: 210-217.
- Lardière-Deguelte S, Ragot E, Amroun K, Piardi T, Dokmak S, Bruno O, et al. Abscès hépatiques : diagnostic et prise en charge. Journal de Chirurgie Viscérale 2015; 152 :233-246.
- Chagneau-Derrode C, Silvain C. Abscès bactériens du foie. Gastroenterol Clin Biol. 2004; 28 :470-476.
- Lin YT, Wang FD, Wu PF, Fung CP. *Klebsiella pneumoniae* liver abscess in diabetic patients: association of glycemic control with the clinical characteristics. BMC Infectious Diseases. 2013 ; 13: 56.
- Wang JH, Liu YC, Lee SS J, Yen MY, Chen YS, Wang JH, et al. Primary Liver Abscess Due to *Klebsiella pneumoniae* in Taiwan. Clinical Infectious Diseases. 1998; 26: 1434-1438.
- Dinnoo A, Barbier L, Soubrane O. Abscès hépatiques à pyogènes: une cause à rechercher. Journal de Chirurgie Viscérale. 2015; 152: 72-73.
- Thomsen RW, Jepsen P, Sorensen HT. Diabetes Mellitus and Pyogenic Liver Abscess: Risk and Prognosis. Clinical Infectious Diseases. 2007; 44: 1194-1201.
- Lederman RE, Crum NF. Pyogenic liver abscess with a focus on *Klebsiella pneumoniae* as a primary pathogen: an emerging disease with unique clinical characteristics. Am J Gastroenterol. 2005; 100: 322-331.
- Kim JK, Chung DR, Wie SH, Yoo JH, Park SW. The Korean Study Group for Liver Abscess. Risk factor analysis of invasive liver abscess caused by the K1 serotype *Klebsiella pneumoniae*. Eur J Clin Microbiol Infect Dis. 2009; 28: 109-111.

11. Wang HH, Tsai SH, Yu CY, Hsu HH, Liu CH, Lin JC, et al. The association of haemoglobin A1c levels with the clinical and CT characteristics of *Klebsiella pneumoniae* liver abscesses in patients with diabetes mellitus. *Eur Radiol*. 2014; 24: 980-989.
12. Hope WW, Vrochides DV, Newcomb WL, Mayo-Smith WW, Lannitti DA. Optimal treatment of hepatic abscess. *Am Surg*. 2008; 74: 178-182.
13. Bamberger DM. Outcome of medical treatment of bacterial abscesses without therapeutic drainage: review of cases reported in the literature. *Clin Infect Dis*. 1996; 23: 592-603.
14. Adehossi EBFK, Baldin B, Berrebi A, Berry A. *Maladies infectieuses tropicales*. e-Pilly; 2012. p. 764-768.
15. Gornik I, Gornik O, Gasparovic V. HbA1c is outcome predictor in diabetic patients with sepsis. *Diabetes Research and Clinical Practice*. 2007; 77: 120-125.
16. Liliensiek B, Weigand MA, Bierhaus A, Nicklas W, Kasper M, Hofer S, et al. Receptor for advanced glycation end products (RAGE) regulates sepsis but not the adaptive immune response. *J Clin Invest*. 2004; 113: 1641-1650.
17. Jepsen P, Vilstrup H, Schonheyder HC, Sorensen HT. A nation wide study of the incidence and 30-day mortality rate of pyogenic liver abscess in Denmark, 1977-2002. *Aliment Pharmacol Ther*. 2005; 21: 1185-1188.
18. Meddings L, Myers RP, Hubbard J, Shaheen AA, Laupland KB, Dixon E, et al. A population based study of pyogenic liver abscesses in the United States: incidence, mortality and temporal trends. *Am J Gastroenterol*. 2010; 105: 117-124.
19. Huang CJ, Pitt HA, Lipsett P, Osterman FA, Lillemoe KD, Cameron JL, et al. Pyogenic hepatic abscess: changing trends over 42 years. *Ann Surg*. 1996; 223: 600-609.
20. Li J, Fu Y, Wang JY, Tu CT, Shen XZ, Li L, et al. Early diagnosis and therapeutic choice of *Klebsiella pneumoniae* liver abscess. *Front Med China*. 2010; 4: 308-316.