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Denutrition in Cirrhosis: Prevalence and Risk Factors among a Moroccan Center

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Abstract **Original Research Article**

Background: Denutrition is common in patients with liver cirrhosis and is recognized as an independent prognostic factor. Its prevalence is correlated with the severity of cirrhosis. Its evaluation is difficult to quantify, due to the presence of many confounding factors, interfering with the usual nutritional parameters. The aim of this work is to evaluate the prevalence of undernutrition among cirrhotic patients using different methods and to identify the risk factors. ***Methods*:** we conducted a prospective descriptive and analytical study of cirrhotic patients, nutritional status was assessed by body mass index (BMI), brachial circumference (BC), nutritional index, mini nutritional assessment (MNA) score, and by the results of the biological assessment. ***Results*:** 135 patients were included, the average age was 50 years the sex ratio was M/F=1/2. The etiology of cirrhosis was essentially viral. The severity of cirrhosis was estimated according to the Child score which B in 59.25% and C in 18.55% of cases. All patients were on a low-salt diet, 55.55% of them had anorexia. The mean body mass index was 20.7 kg/m2. The brachial circumference was in favor of undernutrition in 50 patients. After analytical study, the risk factors significantly associated with anthropometric values in favor of undernutrition were: poor socioeconomic conditions, digestive disorders, low-salt diet, existence of hepatic encephalopathy. ***Conclusion:*** Denutrition in cirrhotic patients constitutes a prognostic factor of mortality independent of cirrhosis, and its evaluation is therefore of increasing interest in the management of cirrhotic patients. In our population, nutritional indexes and BC were the most sensitive methods for the detection of undernutrition. In our population, nutritional indexes and BC were the most sensitive methods to detect undernutrition. The risk factors were related to circumstances inducing a decrease in food intake and hypermetabolism.

Keywords: Denutrition, Cirrhosis, Prevalence, Child-Pugh, risk factors.

INTRODUCTION

As we all know, protein-energy malnutrition is defined as the occurrence of an imbalance between the body's protein-energy intake and requirements, leading to a negative energy balance [1, 2]. In individuals with cirrhosis, malnutrition is most often defined as a loss of skeletal muscle mass and/or strength and a decrease in subcutaneous and visceral fat mass. Alterations in these structural components often occur in the context of decreased protein and total energy intake [3]. It is a very frequent complication and it is considered as an independent predictor of morbidity and mortality as it increases the risk of infection, related complications to portal hypertension as well as the length of hospitalization leading ultimately to death [4-6]. Although malnutrition is not included in the Child-Pugh classification, its presence should alert clinicians along with other complications, such as ascites and hepatic encephalopathy. The main objective of our study was to assess the prevalence and to determine the risk factors in order to plan a Nutritional Management Protocol based on the results that will be used in future studies.

METHODOLOGY

For this purpose, we conducted a retrospective mono-centric cross-sectional study of descriptive and analytical type in our hepato-gastro-enterology department, over a period of 1 year (June 2020 - May 2021). Where we studied the following parameters: Age, etiology of cirrhosis, socio-economic level, presence of ascites, presence of HE, digestive

symptoms, low-salt diet, bleeding complication, HCC transplant complication...

The evaluation of the nutritional status was done with:

- The brachial circumference (BC) +++ (<20 cm for women and <26 cm for men)
- The MNA (mini nutritional assessment) score
- The body mass index (BMI)

And the statistical analysis was performed with the SPSS software. Statistical tests were considered significant for a p value<0.05.

RESULTS

Over a period of 12 months, 135 cases were collected. The average age of our population was 50 (ranging from 18 to 81 years). We noted a feminine predominance with 67% of femals and a sex ratio M/F= 0,48. 71% of our population had a low monthly income below the Minimum wage defined in Morocco by an income of <270 USD. The etiology of cirrhosis was dominated by viral hepatitis B and auto-immun hepatitis wich represented successively 45% and 42% of cases and in 32% of cases the etiology was undetermined. Clinically, our patients had cirrhosis classified according to the prognostic score of Child-Pugh: 59% had a B Child-Pugh score, while 20% had cirrhosis classified as Child-Pugh C. Among our patients: 67% had ascitic decompensation and were therefore put on a low-salt diet where anorexia was noted in 55% of patients; 35 patients had a hepatic encephalopathy and 75 patients had presented at least one episode of bleeding complication.

Concerning the evaluation of the nutritional status:

- According to the BMI
- 25% were malnourished characterized by a BMI <18.5
- While overweight or obesity was noted in 10% of our population.
- The measurement of brachial circumference, being realized in all our patients: objective a denutrition in 41% of the population (Figure 1).
- The mini nutritional assessment score, being the simplest to use showed that 45 patients (34%) had a score <11 or an undernutrition or at risk of undernutrition

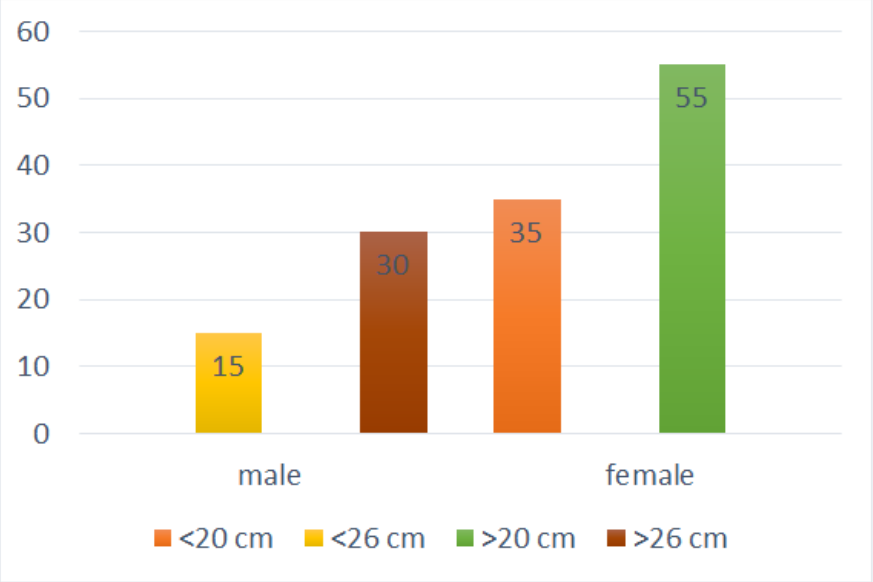

Figure 1: Distribution of patients according to brachial circumference

Therefore, using the 3 methods, the measurement of BC remains superior to the MNA which is subjective and of course the BMI to detect undernutrition.

The second part of our work was the realization of a statistical analysis comparing the 2 methods BMI and CB to detect the risk factors of denutrition.

The 2 analyses concluded that the prognostic score child, the low socio-economic income, the existence of a hemorrhagic complication or an ascitic decompensation and the setting under a low-salt diet are mainly the most alarming risk factors (Figures 2 & 3).

2			Denutrition			(pearson)	(Fisher exact)
			yes	No	Total		
socio-professionnel	mean age		37,3	34,5		0.179	
	Sex	F	15	75	90		0.55
		M	19	16	35		0.28
	Residence	Rural	15	35	50		0.785
		Urbain	19	66	85		
	Social security coverage	CNOPS	5	16	21		0.0869
		CNSS	2	7	10		
		Ramed	27	74	101		
		sans	0	2	2		
		Wafa assuranc	0	1	1		
	Number of children	<2	10	29	39		0.610
		>=2	11	33	44		
		without child	13	24	37		
	Monthly income	low	32	76	86		0.00624
		high	1	1	15		
		medium	2	8	34		
clinique	child score	child A	2	28	30		<0,001
		child B	13	67	80		
		child C	20	5	25		
	ascitis	yes	26	65	91		0,760
		no	9	35	44		
	Digestive hemorrhage	yes	19	56	75		0,234
		no	16	44	60		
	CHC	yes	12	12	24		0,243
		no	23	88	111		
	EH	yes	22	13	35		<0,001
		no	13	87	100		
	low-salt diet	yes	28	63	91		<0,001
		no	7	37	44		
	digestive symptoms	yes	27	69	96		<0,001
		no	8	31	39		

3			Denutrition			(pearson)	(Fisher exact)
			yes	No	Total		
socio-professionnel	mean age		37,3	34,5		0.179	
	Sex	F	15	75	90		0.55
		M	19	16	35		0.28
	Residence	Rural	15	35	50		0.785
		Urbain	19	66	85		
	Social security coverage	CNOPS	5	16	21		0.0869
		CNSS	2	7	10		
		Ramed	27	74	101		
		sans	0	2	2		
		Wafa assuranc	0	1	1		
	Number of children	<2	10	29	39		0.610
		>=2	11	33	44		
		without child	13	24	37		
	Monthly income	low	43	76	86		<0,001
		high	3	1	15		
		medium	4	8	34		
clinique	child score	child A	2	28	30		<0,001
		child B	23	57	80		
		child C	25	0	25		
	ascitis	yes	38	53	91		0,038
		no	12	32	44		
	Digestive hemorrhage	yes	28	47	75		0,023
		no	22	38	60		
	CHC	yes	18	6	24		0,243
		no	32	79	111		
	EH	yes	32	3	35		0,789
		no	18	82	100		
	low-salt diet	yes	38	53	91		<0,001
		no	12	32	44		
	digestive symptoms	yes	31	65	96		<0,001
		no	19	20	39		

Figure 2-3: Analytical analysis of patients according to BMI (2) and CB (3)

DISCUSSION

Denutrition is common in patients with liver cirrhosis awaiting transplantation. Its average prevalence is estimated at 30% in cirrhosis and increases with the severity of cirrhosis [7]. Thus, it is found in only 20% of patients with Child-Pugh stage A cirrhosis, but in 60% of patients with Child-Pugh C cirrhosis [8]. Nutritional status is an important predictor of morbidity and mortality in cirrhosis, therefore, it is of crucial importance to assess nutritional status and start early appropriate interventions in order to minimize liver decompensation and mortality and this has been proven by the EASL and ESPEN recommendations [9, 10].

In our study the prevalence varied between 25-41% while in the literature it varies between 75-90%.It was estimated in Italy at 53% [11]., Romania at 57% [12], Brazil at 75% [13] and Pakistan at 73% [14]. This difference in the prevalence estimate can be explained by the small sample size of our study, the subjectivity of the different methods used to estimate it

Assessment of nutritional status is difficult in cirrhotic patients, and only brachial muscle circumference (BMC) is considered reliable in all circumstances [7, 8]. The usual nutritional assessment parameters are not always interpretable in cirrhosis: weight varies with the presence of ascites or edema, body composition by bioimpedancemetry is unreliable because of abnormal water movement, albuminemia mainly reflects hepatic synthesis function, and 24-hour creatinineuria may be distorted by the sometimes associated functional renal insufficiency [15].

Our study showed a mean brachial circumference of 24.2 cm with extremes ranging from 14 to 34 cm. This brachial circumference was in favor of undernutrition (less than 24 cm for women and 26 cm for men) in 41% of all stages of Child Pugh. Our results were closer to those of M. Eljihad in Casa [16] who found a prevalence of undernutrition of 57% while M. Medhioub in Nabeul [17] found that 30% of his population was undernourished. The body mass index (BMI) is a good index of nutritional status in the general population. However, in patients with ascites and edema, it does not reflect nutritional disorders. In our population, the average body mass index is 20,7 Kg/m2 and 102 patients out of 135 had a BMI greater than or equal to 18 Kg/m2.

Several factors are present in the development of malnutrition in cirrhotic patient; in our study the prognostic score child, the low socio-economic income, the existence of a hemorrhagic complication or an ascitic decompensation and the setting under a low-salt diet are mainly the most alarming risk factors, these factors were reported in the Topan study [12] and Fernandes [18] were the most common risk factors were the Child Pugh score, hemorrhage, hyponatremia...

CONCLUSION

Malnutrition is common in cirrhosis and negatively affects the prognosis. It must therefore be systematically sought by a global clinical evaluation. In our population, nutritional indexes and BC were the most sensitive methods for screening for malnutrition. The risk factors were related to circumstances inducing a decrease in food intake and hyper metabolism.

Conflicts of interest: The authors declare no conflicts of interest.

Authors' Contributions

All authors contributed to the conduct of this work. All authors have read andapproved the final manuscript.

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