

Hemodialysis headache: An Italian study

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ABSTRACT

Objective. The aim of this study was to establish the prevalence of hemodialysis headache in a population of Calabrian subjects, in Italy.

Methods. We observed a sample of hemodialysis subjects, studied at the University Hospital of Catanzaro and the Hospital of Melito PS, Reggio Calabria. The patients were investigated for the search for hemodialysis headache. The inclusion criteria of the subjects in the study were respected, such as the characteristics of the headache and the close relationship with dialysis.

Results. The results showed a percentage of hemodialysis headache around 5% of cases. The percentage we found was very low compared with some literature data revealing percentages up to 70% of cases.

Conclusions. This discrepancy of data is unclear, the results we obtained are in line with few cases of literature. However, our results pose important reflections on the actual prevalence of hemodialysis headache.

Keywords: headache, hemodialysis headache, homeostasis disorders

INTRODUCTION

The International Classification of Headache Disorders, 3rd edition (ICHD-3) has included hemodialysis headache (HDH) among headaches from homeostasis disorders. It doesn't have specific features, occurs during hemodialysis and can last up to 72 hours after treatment. Clinically, the headache may affect a region of the skull or spread throughout the entire skull. The pain is described as gravative, constrictive, accompanied by phono-photophobia, and the intensity can sometimes be severe.

The pathophysiology of HDH is not known, but some triggering factors have been identified, such as changes in blood pressure, serum sodium and magnesium levels during hemodialysis (1), and stress. Treatment depends on pain tolerance and non-steroidal anti-inflammatory drugs (NSAIDs) are used (2). The prevalence of HDH varies according to the studies reported in the literature. The data

are not uniform with different percentages of prevalence reported. The diagnostic criteria must be respected, in order to have a precise evaluation of the pathology. We present a series of cases obtained from a sample of hemodialysis patients, describing the characteristics of the headaches by comparing them with the literature data.

MATERIALS AND METHODS

The sample consisted of 100 patients affected by uremia undergoing tri-weekly hemodialysis. The patients were observed at the Department of Nephrology and Dialysis of the University Hospital of Catanzaro, Italy and that of the Hospital of Melito PS, in the province of Reggio Calabria, Italy. Age ranged from 40 to 82 years, 70 males and 30 females. The aim was to find patients suffering from hemodialysis headache. We prepared a form containing the criteria for the inclusion of patients presenting with hemodialysis headache, type, duration

of pain, close correlation with the timing of dialysis, absence of any pre-existing headache. No correlation of HDH with a simultaneous increase in blood pressure during dialysis has been found. The parameters of renal function included urea, creatinine, calcium, phosphorus, parathyroid hormone, the results of which are shown in table 1. Magnesium blood dosage showed in 3 patients, slightly lower values: 1.39, 1.38, 1.36 mEq/L (normal values: 1.41-1.85 mEq/L). The administered forms gave the following results: of the 100 patients, only 5 had hemodialysis headache, 3 males, 2 females, aged between 47 and 68 years, and regarding the pain intensity, we found severe pain in 2 patients, assessed with the Visual Analogue Scale (VAS), which showed a score of 8 for both. These patients were subjected to hemodialysis for about 10 years. The 3 remaining patients showed a VAS score of 5-6. Only patients with a VAS score of 8 had pain medications.

TABLE 1. Hemodialysis renal parameters

Sex	Age	VAS	Urea	Creatinine	Calcium	Phosphorus	Parathormone
M	84	8	167	9,1	10,4	5,4	1036
F	81	5	146	9,4	7,6	7,2	156
F	58	8	178	10,9	7,7	5,6	1049,7
M	70	5	175	10,2	8,1	5,8	1037
M	64	6	176	9,1	7,7	7,3	160

DISCUSSION

Hemodialysis headache (HDH) belongs to the group of headaches from homeostasis disorders. It is a headache present in hemodialysis patients, being closely linked with hemodialysis session to the subject, and which lasts up to 72 hours after the session has ended. So far studies that have been conducted have shown a variability concerning the prevalence in the tested samples. Antoniazzi et al, 2003, found 87 patients receiving hemodialysis in a sample out of 123 (70,7%) complained of headache, such as migraine and tension-type headache. Fifty patients (57.5%) experienced migraine and tension type headache (3).

Prior to beginning dialysis, 48% of these 87 patients had a migraine, 19% had an episodic tension-type headache, 8% had both. Thirty-four of these were classified as dialysis headache. In addition, arterial hypertension (38%), arterial hypoten-

sion (12%) and changes in the weight during the hemodialysis sessions (6%) are considered as the factors most likely to triggering dialysis headache (3). According to Sousa Melo et al (2017) the prevalence of dialysis headache varies between 27% and 73%. Among the characteristics of this headache are the frontal location, moderate to severe intensity, and onset a few hours after the beginning of dialysis. The headache may be accompanied by nausea and vomiting (4). Regarding the type of headache, a case of new-onset hemodialysis headache has been reported as a migraine with aura (Chirchiglia D et al, 2016) (5). The physiopathology of hemodialysis headache is still not completely understood, but some trigger factors could be variations in urea, sodium, magnesium, blood pressure, and weight levels (6,7,8). The hematoencephalic barrier might have an important role since variations in electrolyte and urea levels occur in the systemic circulation during hemodialysis and the flow of free water through the hematoencephalic barrier may lead to cerebral edema. Other factors may include nitric oxide, calcitonin gene-related peptide, and substance P. There is need to maintain dialysate volume and control over electrolytes and blood pressure and to avoid caffeine for the prevention of HDH (9,10,11). Gocksel et al (2006) studied 250 HDH patients. Of these, 75 were diagnosed with HDH according to International Headache Society criteria. Eighty HD patients without HDH were selected as a control group. For each HDH and control subject, arterial diastolic and systolic blood pressure, body weight, and serum levels of sodium, blood urea nitrogen, creatinine, and Mg were measured before and after one HD session. Urea reduction rate and ultrafiltration volume were determined. Serum levels of phosphorus, calcium, albumin, and parathormone were measured only before the session. Findings in the HDH and control group were compared. There were no significant differences between the HDH and control groups with respect to predialysis values for blood urea nitrogen, body weight, and arterial blood pressure, while serum Mg levels were found to be low (12). Gozubatik-Celik G et al, 2018, in 494 patients found 175 of them (35.4%) with a mean age of 57.3 ± 15.7 years who were diagnosed with HDH (13). In a group of 143 patients examined, 27 (18.9%) patients had HDH (Marjia et al, 2007) (14).

Hemodialysis headache is a particular form of secondary headache, linked to session dialysis. We do not have much data in the literature, and the studies we have described show various cases with different results. Our sample showed a 5% incidence in HDH, which is a low percentage compared to other literature data but we have observed a strict criteria of selection, not inserting other forms of headache in the cases of HDH. Risk factors are invoked as increased blood pressure during dialysis (15). Another factor that may be considered is decrease in magnesium, after hemodialysis (16). Increased levels of magnesium are commonly associated with chronic kidney failure while magnesium deficiency is present in case of increased

renal loss as in case of hypoparathyroidism. Hypomagnesemia, although mild, found in 3 of the 5 subjects HDH appears to be in agreement with the literature data, according to which it would represent a risk factor for this type of headache.

CONCLUSIONS

In this study we have described our experience concerning hemodialysis headache, seeking the prevalence in a sample of uremic subjects, undergoing tri-weekly hemodialysis and obtaining a percentage of 5%, a result that, compared with other cases, shows that this type of headache is not frequent in the population we studied.

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