Cluster Headache Provoked by Hemodialysis in a 60 Year Old Woman: A Case Report

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Introduction

Three years ago we observed a woman with Cluster Headaches (CH) provoked by Haemodialysis (HD). A recent Pub Med search with “cluster headache” and “haemodialysis” gave one reference of a patient with chronic cluster headaches for 30 years and haemodialysis for 10 years. He was treated during haemodialysis with good effect of double dose lithium on dialysis days [1].

By Googling the www for haemodialysis and cluster headache, we found the following cry for help:

“I've been on dialysis for 8 months and have suddenly been afflicted with headaches. My doctor calls them cluster headaches. They come on late in my treatment time—usually within the last hour—and they are debilitating. I have no idea what to do. My doctor tells me that dialysis does not cause headaches, but how can it be so when I had no headaches before dialysis (an extract from [2]).

This provocation of cluster headache by haemodialysis has not been described in the medical literature. We therefore present such a case.

Case Story

The patient who is currently a 60 year old woman, height 165 cm and weight 81 kg, had a brain stem infarct (incomplete Wallenberg’s syndrome) when she was 46 years old. This left her with decreased thermosensibility on the right hand and arm. She started peritoneal dialysis in 2002 because of chronic polycystic nephropathy and nephrolithiasis. This was changed in 2004 to HD because of peritonitis. She started experiencing severe unilateral headaches during HD in 2004 (in connection with the 10th HD). It was an excruciating pain in the left frontal region and in the left eye, accompanied by tearing. It started 30 to 45 min after start of HD. The duration of attacks was between 45–60 minutes. HD sessions were 3 times weekly and lasted 3–3½ hours with bicarbonate based dialysis solutions. The patient was at first treated with carbamazepin for a trigeminal neuralgia without effect. It was not until 2008 that she was diagnosed with cluster headache and since then has been treated with verapamil, first at a dose of 240 mg daily and oxygen. She was attacked free for half a year but the dose was reduced to 120 mg because of hypotensive crises during HD. This resulted in mild cluster attacks with mild boring pain around her left eye during HD sessions and two mild nightly attacks 2 times per week. Luckily all the attacks responded well to oxygen treatment (7 litres via face mask). A later attempt at discontinue verapamil resulted in rebound cluster attacks (10–12 per week), she was back again on 120 mg verapamil. This dose was however discontinued 6 months later, because of severe hypotensive crises during HD sessions, presumably due to severe atherosclerosis, progressive renal failure and mitral valve incompetence. This naturally resulted in rebound cluster attacks. When she did not respond to intensive oxygen treatment (12 litres via face mask), lamotrigine and prednisolon treatments, she received greater occipital nerve (GON) blockade in October 2011, as a last management resort with good results. She has not had HD-provoked cluster attacks since then.

Discussion

Headache during haemodialysis is a common neurologic symptom that was first described by Graham’s group in 1972 with a frequency as high as 70% [3]. A 2 year prospective study of 123 HD-patients by Antoniauzzi et al. reported about the same high frequency (71%) of HD-related headaches [4], of which 50 (79.4%) had headaches during haemodialysis sessions. The majority (68%) fulfilled the IHS criteria for dialysis headaches (DH) [5], most of which had either DH with migraineous features (38%) or tension-type headache features (26%). Others had migraine without aura (4%), migraine with aura (2%) and episodic tension-type (14%). None fulfilled the IHS criteria for cluster headaches [4]. Our patient fulfilled the IHS diagnostic criteria for chronic cluster headache, but attacks were provoked by haemodialysis (although some attacks occurred later in between haemodialysis sessions).

The pathogenesis of HD-related headaches are poorly understood and seems to be multifactorial. Earlier studies have shown that biochemical changes especially of pre- and post HD blood urea levels are statistically significant [6]. Fall in blood urea levels during HD, results in the so-called reverse urea effect; an osmotic gradient, which results in raised intracranial pressure due to water shifts into the brain. Other biochemical parameters such as Na, K, and creatinine do not show significant results. Other precipitating factors to HD-related headaches are low magnesium levels [7], rapid HD leading to dialysis disequilibrium syndrome (which is rarely seen today with improved dialysis techniques), type of dialyser; notably acetate [8], hypertension and concomitant use of antihypertensive that could result in headaches, alcohol, histamine, sublingual nitroglycerine and obstructive sleep apnoea [9], all of which were ruled out in our patient. The mechanism behind the cluster headache inducing effect of haemodialysis in our patient remains an enigma. It is remarkable that the patient had no cluster headache during the two years of peritoneal dialysis. One of several explanations could be that peritoneal dialysis does not change the balance of compounds between blood and the brain as fast and drastic as seen in haemodialysis.

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Most likely a cluster headache diathesis is needed—a hypothetical hypothalamic stress during haemodialysis. There is a scarcity of literature as to the frequency and management of cluster headaches provoked by haemodialysis. Our patient was not treated with lithium because of its small therapeutic window and high risks of toxicity, but responded well to oxygen and verapamil, which was later discontinued because of severe hypotensive crises. The resulting relapse of cluster attacks was treated with GON blockade in October 2011 with amazing results. It is noteworthy that haemodialysis patients that develop unilateral headaches could have it as a result of cluster headaches, which respond well to simple oxygen, verapamil, and in refractory cases GON blockade treatments.

References