Cannabinoid hyperemesis syndrome. A report of six new cases and a summary of previous reports

Síndrome de hiperemesis cannabinoide. Reporte de seis nuevos casos clínicos y resumen de casos previos publicados

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Abstract

Cannabinoid hyperemesis syndrome (CHS) is a medical condition which was identified for the first time in 2004 and affects chronic users of cannabis. It is characterized by cyclic episodes of uncontrollable vomiting as well as compulsive bathing in hot water. The episodes have a duration of two to four days. The vomiting is recognizable by a lack of response to regular antiemetic treatment, and subsides only with cannabis abstinence, reappearing in periods of consumption of this substance.

The etiology of this syndrome is unknown.

Up until June 2014, 83 cases of CHS were published worldwide, four of them in Spain.

The first patient of CHS at Mataró Hospital was diagnosed in 2012. Since then, five new cases have been identified. The average duration between the onset of acute CHS episodes and diagnosis is 6.1 years, similar to that observed in previously published cases, an average of 3.1 years. This "delay" of CHS diagnosis demonstrates a lack of awareness with respect to this medical condition in the healthcare profession.

With the objective of providing information concerning CHS and facilitating its timely diagnosis, a series of six new cases of CHS diagnosed in Mataró Hospital is presented along with a summary of cases published between 2004 and June 2014.

Keywords: cannabinoid hyperemesis, cannabis, cyclical vomiting, compulsive hot bathing.

Resumen

El sindrome de hiperemesis cannabinoide (SHC) es una entidad clínica descrita por primera vez en 2004, la cual afecta a consumidores crónicos de cannabis y se caracteriza por episodios cíclicos de vómitos incoercibles acompañados por baños en agua caliente compulsivos. Estos episodios tienen una duración de 2 a 4 días. Los vómitos se caracterizan por no responder al tratamiento antiemético habitual, cediendo unicamente con la abstinencia de cannabis, reapareciendo en períodos de consumo de esta sustancia.

Hasta Junio de 2014 fueron publicados 83 casos de SHC en el mundo, 4 de ellos en España, siendo la etiología de este sindrome aún desconocida.

En el hospital de Mataró se diagnosticó un primer paciente de SHC en 2012. Desde entonces se han identificado cinco nuevos casos. Destaca en ellos un tiempo promedio de 6,1 años entre el inicio de los episodios agudos de SHC y el diagnóstico (3,1 años en los casos previos publicados). Este tiempo de "retraso" del diagnóstico de SHC evidencia un desconocimiento respecto a esta entidad clínica en los servicios de salud.

Con el objetivo de aportar información respecto al SHC y facilitar con ello su diagnóstico oportuno, se presenta esta serie de seis nuevos casos de SHC diagnosticados en el Hospital de Mataró y un resumen de los casos publicados entre 2004 y Junio de 2014.

Palabras clave: hiperemesis cannabinoide, cannabis, vómitos cíclicos, baños en agua caliente compulsivos.

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Cannabis is one of the most commonly used addictive substances worldwide (United Nations Office on Drugs and Crime, n.d.).

In Spain, it is the illegal psychoactive substance used most widely at some point in life in the general population (27.4%), and the substance tried at the earliest age for the first time (18.7 years) (Spanish Observatory on Drugs, 2012; Delegación del Gobierno para el Plan Nacional sobre Drogas, 2010).

The effects of cannabinoids on the organism are mediated by the binding of exogenous cannabinoids found in the marihuana plant to the endocannabinoid receptors (CB1 and CB2) widely distributed throughout the organism (Table 1). Of the 66 exogenous cannabinoids, Delta-9- tetrahydrocannabinol (D9-THC) is the psychoactive component via its binding to the CB1 receptor.

The study of the effects of D9-THC on the organism has enabled the use of cannabis for therapeutic purposes (Duran & Capellà, 2004; Lorenzo & Leza, 2000), and one example of this is its application as an antiemetic for controlling nausea and vomiting in chemotherapy patients (Adler & Colbert, 2013; Rodriguez de Fonseca & Navarro, 2000).

In contrast to these antiemetic properties, in 2004 nine cases of a new syndrome, named cannabinoid hyperemesis (CHS), were published. This syndrome affects chronic cannabis users and is characterized by cyclical episodes of uncontrollable vomiting and compulsive bathing in hot water. These episodes subsided when abstaining from the substance and reappeared on renewed consumption (Allen, de Moore, Heddle, & Twartz, 2004).

Since the publication of Allen et al. (2004) until June 2014, 74 new cases were reported in various European countries, four of them in Spain (Aguilar-Urbano, Perez-Asia, Navarro-Jarabo, & Sánchez-Cantos, 2011; Alfonso, Ojeda, & Moreno-Osset, 2006; Ochoa-Mangado, Jiménez, Salvador, & Madoz-Gúrpide, 2013; Roca-Pallín, López-Pelayo, Sugranyes, & Balcells-Oliveró, 2013).

Some diagnostic criteria have been put forward for CHS (Table 2) (Simonetto, Oxentenko, Herman, & Szostek, 2012; Sontineni, 2009), as well as an algorithm for the diagnosis and treatment of the syndrome (Wallace,

Table 1. *Distribution of endocannabinoid receptors in the organism.*

Receptor	Location	Receptor	Location
CB1		CB2	
	Central nervous system		Central nervous system
	Cerebral cortex		Immune system
	Basal ganglia		
	Cerebellum		
	Hypothalamus		
	Hippocampus		
	Adipose tissue		
	Gastrointestinal tract		
	Respiratory system		
	Cardiac system		
	Reproductive system		

Table 2. *Proposed diagnostic criteria for Cannabinoid Hyperemesis Syndrome.*

Essential criterion	
	Chronic consumer of cannabis: longer than one year.
Main criteria	
	Severe nausea and vomiting
	Improvement with cannabis abstinence
	Relief of symptoms with bathing in hot water
	Epigastric or periumbilical abdominal pain
Supporting criterion	
	Younger than 50 years of age
	Loss of weight greater than 5 kilos
	Symptoms predominantly in the mornings
	Normal bowel habits
	Normal laboratory test, radiography and endoscopy results

Table 3. *Pathophysiology of Cannabinoid Hyperemesis Syndrome.*

Author	Theory
Darmani, 2002; Woods et al. 2014	In theory the antiemetic effect of cannabis is mediated by the binding of D9-THC to CB1as a partial agonist, producing antiemesis at low doses and hyperemesis at high doses.
Woods et al., 2014	In genetically susceptible individuals, high doses of cannabis could be mediated by a disorder of hepatic cytochrome p450 which metabolizes D9-THC, producing an increase in its concentration.
Allen et al., 2004	In genetically susceptible individuals, the high liposolubility of D9-THC would mediate an over-accumulation in fatty tissue.
Allen et al., 2004	Bathing in hot water may relieve a false sensation of cold mediated by the effect of D9-THC at the level of CB1 located in the hypothalamus.
Allen et al., 2004	Bathing in hot water may relieve a real sensation of cold caused by vasoconstriction of the superficial capillaries and vasodilatation of the deep capillaries produced by the union of D9-THC to CB1

Table 4. *Summary of treatments used in Cannabinoid Hyperemesis Syndrome.*

Drug	Indication and dose	Therapeutic response	Author
Serum NaCl 0.9% E.V.	Hydration 1-2 L bolus followed by 150-200 mL/h in 24-48 h	Clinical improvement	Allen et al. 2004; Price et al. 2011.
Morphine	Pain 4 mg IV on patient's demand	Clinical improvement	Price et al. 2011
Paracetamol	Cephalea 650 mg oral if pain	Clinical improvement	Price et al. 2011
Lorazepam	Nausea/vomiting 1mg IV x 1 OR 1 mg IV c/4 h on demand	Clinical improvement	Cox et al. 2012; Price et al. 2011.
Clorpromazine	Hiccough 25 mg IV on demand	Clinical improvement	Price et al. 2011
Haloperidol	5 mg IV frequency not described	Clinical improvement	Hickey et al. 2013.
Ondansetron	4 mg IV frequency not described	Clinical improvement	Hickey et al. 2013.

Andrews, Garmany, & Jelley, 2011). However, the etiology of CHS is still unknown, and Table 3 summarizes the pathophysiological theories so far proposed for CHS. Given this context, treatment for acute episodes is symptomatic (Table 4). The pathophysiology of CHS, and in more detail the clinical practice and therapeutic guidelines for the treatment of acute episodes can be found in the publications of the cases.

The first diagnosis of CHS was made in Mataró hospital in 2012. The patient was a 35-year old man, a chronic consumer of cannabis presenting with episodes of hyperemesis since 2002 and diagnosed with psychogenic vomiting. On the diagnosis of CHS, medical units of the hospital were alerted to the new medical condition, after which five new cases of CHS were identified up until June 2014 (Table 5).

Similarly to the cases previously published (Table 6), in this series of six new cases an average of period of over a year passed between initial symptoms and correct diagnosis of CHS. During this time, patients were subjected to medical tests with negative results, and more the 50% of patients were hospitalized at least once for etiological analysis.

With the aim of providing information about this new clinical condition and facilitating prompt diagnosis of CHS, this study offers a summary of previously published cases and a description of new cases diagnosed in Mataró hospital.

Method

Reports of new cases

Six adult patients (minimum age 22) labeled with the letters A, B, C, D, E, F were treated in various units of Mataró hospital between November 2012 and June 2014 for uncontrollable vomiting and hot baths, and diagnosed with CHS (Table 4). Three patients were referred by the emergency department to the emergency psychiatric unit to assess their "self-induced vomiting" and potomania (patients A, B and D). One patient was referred by a primary healthcare physician to a drug addiction center for cannabis cessation treatment (patient E); and two patients were hospitalized in the surgical unit for a study of vomiting, during which time consultation with a psychiatrist was sought on the grounds of anxiety (patients C and F).

Summary of published cases

A bibliographic review was carried out using the online PubMed database.

The search terms "cannabinoid hyperemesis syndrome" and "cannabinoid hyperemesis" were used. No time limits were set. All articles in English, Spanish, German, and French with explicit reference to this medical condition in the title and published prior to June 2014 were selected.

Of the 60 articles selected, 44 corresponded to reports (Table 6). One of these was excluded because it was a retrospective survey (Simonetto, Oxentenko, Herman, & Szostek, 2012). Four articles corresponded to bibliographic reviews (Galli, Andari, & Friedenberg, 2011; Nicolson, Denysenko, Mulcare, Vito, & Chabon, 2012; Sun & Zimmermann, 2013; Wallace et al., 2011), one of which also reports four cases (Nicolson et al., 2012); ten articles were letters to the editor (Aguilar-Urbano et al., 2011; Alfonso et al., 2006; Budhraja, 2009; Roca-Pallín et al., 2013; Roche & Foster, 2005; Roelofs, Vorel, Vorel-Havelkova, & Brombacher-Heerlen, 2005; Sannarangappa & Tan, 2009; Singh & Coyle, 2008; Torka & Sharma, 2012; Wolfhagen, 2014) of which seven also reported cases (Aguilar-Urbano et al., 2011; Alfonso et al., 2006; Roca-Pallín et al., 2013; Roche et al., 2005; Sannarangappa et al., 2009; Torka et al., 2012; Wolfhagen, 2014). Finally, two articles consisted of clinical notes, without presenting a case (Francis, 2011; Sullivan, 2010).

A table summarizing the published clinical cases of CHS up to June 2014 was drawn up (Table 5).

Table 5. *Clinical features of six new cases of CHS.*

	A	B	C	D	E	F
Age (years)	37	22	26	31	29	25
Sex	M	M	F	M	M	M
Cannabis onset age (years)	24	14	18	16	15	13
Units smoked/day	1	<1	1	3 to 6	10 to 12	1 to 2
Use of other toxic substances	Tobacco and alcohol	Tobacco and alcohol	No	Tobacco, alcohol, cocaine and heroin	Tobacco, cocaine, amphetamines and others	Tobacco and alcohol
Age onset of vomiting (years)	27	16	23	21	22	24
Bathing in hot water	Yes	No	Yes	Yes	Yes	Yes
Other symptoms during acute episode	Polydipsia	No	Polydipsia	No	Polydipsia	Epigastralgia
Duration of acute episode (days)	3 to 4	3 to 4	4 to 5	2 to 3	4 to 5	3 to 4
Annual frequency of acute episode	2 to 4	2	4	1 to 2	2 to 3	6
Years between onset of consumption and onset of vomiting	3	2	5	5	7	11
Years between onset of vomiting and diagnosis	10	6	3	10	7	1
N. of visits to emergency dept. before diagnosis	>30	4	6	12	4	6
N. of hospitalizations before diagnosis	>3	No	3	No	No	1
Abstinence after psychoeducation about CHS	No	Yes	Yes	No	Yes	No

Results

Series of six new cases identified in Mataró hospital

Table 5 presents a summary of the clinical features of the six patients diagnosed with CHS in Mataró hospital between November 2012 and June 2014. There were five men (83%) and one woman (17%), with an average age of 28.3 and average onset age of cannabis use of 16. All patients said they started smoking cannabis recreationally and continued using it for its anxiolytic effect.

The average quantity and frequency of cannabis use was 7.5 cigarettes per day (with a minimum of less than 1 and a maximum of 12 cigarettes per day). One patient (B) described smoking less than one cigarette per day. All other patients said they smoked more than one cannabis cigarette a day. All patients affirmed that they had been smoking cannabis for at least a year before the first acute episode of CHS; the average was 5.5 years (minimum 2, maximum 11).

The average length of time between the onset of symptoms and diagnosis of CHS was 6.1 years (minimum 1, maximum 10). During this period, the patients went to the emergency department an average of ten times with incoercible vomiting and were subjected to etiological analysis which included at least one abdominal X-ray, an upper endoscopy and a blood test per patient. Three of the six patients (C, E and F) had to be admitted to the surgery department for these and other diagnostic tests. However, none of these analyses detected any somatic pathology which could cause vomiting and compulsive hot bathing.

During acute episodes, patients needed treatment in the emergency department, where it was observed that the six patients had a generally uncooperative attitude and suffered from anxiety and compulsive hot bathing, taking up to ten baths a day (patient A) and at least four (patient D). Three patients had polydipsia (A, C and E). All six patients achieved clinical remission after an average of 3.6 days of cannabis abstinence (minimum 2, maximum 5), coinciding with the length of their stay in the emergency ward for the treatment of acute CHS symptoms. It was an enforced abstinence given that they were in hospital.

For the symptomatic treatment of the acute CHS episode, the six patients received metoclopramide, 20-30 mg/day intramuscularly, and ondansetron in 4 mg/day doses of intravenously. As an anxiolytic, diazepam was administered in doses of up to 40 mg/day orally. In acute episodes of vomiting, patient A was uncooperative, demanding treatment, distressed and suffering from psychomotor agitation; up to 40 mg/day of olanzapine was therefore administered orally or intramuscularly, and up to 20 mg/day of haloperidol administered intramuscularly or intravenously. The use of these drugs brought about a temporary therapeutic response, with relief of both nausea and anxiety for a minimum of one and a maximum of four hours, af-

ter which symptoms manifested themselves again with the same degree of intensity observed before the respective drug was administered.

After the CHS diagnosis, all patients were advised to abstain from cannabis use and were offered cessation treatment, which they accepted and to which responded differently.

Up until the presentation of this study, five patients (A, B, C, E and F) were monitored by drug dependency units. Of these, B, C and E achieved continued cannabis abstinence and a consequent absence of new CHS episodes. Of those who continued using cannabis, patient A relapsed into regular consumption and had on average one episode of acute CHS per month, while patient F reported reducing cannabis consumption from three to one cigarettes per day, without renewed CHS episodes being observed during outpatient monitoring.

The patient who abandoned treatment (D), did not register again for CHS treatment in emergency or primary care.

Summary of previously published cases

A total of 83 published cases of CHS were found (Table 5). The average age was 29.57 years (standard deviation 8.43), with a majority of male patients (72.2% of cases).

The average onset age of cannabis use was 17.38 (SD 6.69), and the average age when vomiting began was 25.89 (SD 8.239). The period of time between the onset of symptoms and diagnosis of CHS was observed to be between less than one year and 29 years (average 3.01 years, SD 4.1 years). Bathing in hot water was present in 91% of cases.

The described treatments administered were of a symptomatic nature. All studies concur in observing that standard antiemetics had "little or no" effect. The drugs used in treatment are summarized in Table 4.

Regarding the advice that continued abstinence is the most effective treatment for CHS, differences depending on the type of publication were observed. Giving this advice to patients was mentioned in 70 of the 83 cases. Of these 70 patients, 59 (84.2%) reported abstinence, while 11 patients reported maintaining use. Of the 59 remaining abstinent, 8 suffered new CHS episodes. In 13 cases the corresponding article failed to mention whether the advice to remain abstinent once CHS was diagnosed was given to the patients concerned.

Discussion

The six patients diagnosed with CHS in Mataró hostpital met the diagnostic criteria proposed by Simonetto et al. (2012) presented in Table 2. As observed in earlier publications, the patients were young, mostly male and had been suffering cyclic vomiting for more than a year. They had also been diagnosed wrongly and been subjected to etiological analyses with negative results.

After the first case of CHS was identified in Mataró hospital, the different medical units were informed about this new condition and patients presenting with cyclic vomiting and having a history of chronic cannabis consumption were subsequently referred to the mental health department for possible CHS. In such cases, hot bathing proved to be a decisive element for the correct diagnosis. This clinical sign, which was proposed as pathognomic of CHS (Wallace et al., 2011) was described by the six patients diagnosed in Mataró hospital, matching the observations made in the previously published cases (hot bathing is reported in 91%). This "compulsive" bathing is described as a learned behavior. During the hyperemetic phase, patients note their symptoms relieved during their usual bathing and therefore repeat the behavior. The relief observed is proportional to the water temperature (Allen et al., 2004). In terms of frequency, the description in the published cases is varied. In one report, for example, a patient had 15 baths a day (Mohammed, Panchoo, Bartholemew, & Maharaj, 2013), and in another, a patient claimed to spend four hours a day in the bath (Cox, Chhabra, Adler, Simmons, & Randlett, 2012). In our series, patient A "needed" more than ten baths per day, and the rest between three and five per day. As a complication of the bathing, erytheme ab igne was identified in one of the patients described who took five or six hot baths daily (Kraemer, La Hoz, & Willig, 2013).

During acute episodes of CHS, the six patients diagnosed in our hospital needed intravenous rehydration and were kept under observation in the emergency department for a minimum of 48 hours. In addition, patient A was admitted to intensive care on two occasions with symptoms of acute renal failure, a complication described in one previously published case (Habboushe & Sedor, 2014).

Other complications of CHS described in previous publications are: weight loss (Allen et al., 2004; Singh et al., 2007) and esophagitis (Allen et al., 2004; Chang & Windish, 2009; Sontineni, 2009).

It must be noted that abstinence was not observed in the all the cases where patients were offered medical advice about the link between cannabis consumption and CHS. In our series of cases, the patient with the greatest number of acute episodes of CHS and with the most serious complications (patient A), is the only one who has continued using cannabis habitually (and subsequently suffered monthly episodes of CHS) to date. This situation is consistent with the deleterious effect cannabis can have on the control of decision-making (Alameda-Bailén, Salguero-Alcañiz, Merchán-Clavellino, & Paíno-Quesada, 2014), which increases the likelihood among susceptible individuals of continuing consumption, and with it the episodes of CHS.

Table 6. *Cases of Cannabinoid Hyperemesis Syndrome published up to June 2014.*

Author	No. of case	Age (years)	Sex	Bathing in hot water	Age of cannabis onset (years)	Years of consumption before onset of vomiting	Years of consumption before diagnosis	Improvement with abstinence
Allen et al.	1	23	male	yes	19	3	1.3	yes
	2	29	female	yes	17	3	9	yes
	3	44	male	yes	16	6	12	yes
	4	37	male	yes	17	17	3	yes
	5	21	male	yes	12	5	4	no
	6	38	male	yes	17	17	4	yes
	7	36	female	yes	12	2	3	yes
	8	21	female	yes	14	3	0.5	yes
	9	49	female	no	18	14	6	no
Boeckxstaens	10	30	male	yes	14	not mentioned	not mentioned	not mentioned
Roche and Foster	11	38	male	yes	not mentioned	not mentioned	2	yes
Alfonso Moreno et al	12	49	female	yes	18	2	29	yes
Wallace et al	13	30	male	not mentioned	18	7	5	yes
Chapyala & Olden	14	38	male	yes	18	17	3	yes
Singh & Coyle	15	46	male	yes	not mentioned	not mentioned	not mentioned	yes
Chang & Windish	16	25	female	yes	19	5	1	yes
Ochoa-Mangado et al	17	25	female	yes	19	11	7	yes
Sannarangappa & Tan	18	34	male	yes	19	55	10	yes
Sontinent et al	19	22	male	yes	16	5	0.2	yes
Watts	20	32	male	yes	16	13	3	yes
Donnino et al	21	22	male	yes	not mentioned	not mentioned	2.1	yes
	22	23	male	yes	20	1	1.7	yes
	23	51	male	yes	not mentioned	not mentioned	2	yes
Soriano-Co et al	24	34	male	yes	20	19	1	yes
	25	34	female	yes	13	19	2	no
	26	26	male	yes	14	9	5	yes
	27	34	male	yes	10	21	3	yes
	28	38	female	yes	15	15	8	yes
	29	27	male	yes	9	19	o	no
	30	35	male	yes	15	20	0	no
	31	31	female	yes	13	16	2	no improvement
Price et al	32	30	male	yes	not mentioned	not mentioned	not mentioned	not mentioned
Shmid et al	33	36	male	yes	13	not mentioned	not mentioned	yes
Miller et al	34	17	male	yes	14	1	1	yes
	35	18	female	yes	16	2	1.5	yes
Patterson et al	36	20	male	yes	16	3	3	no abstinence
	37	27	male	yes	17	10	9	no abstinence
	38	31	male	yes	15	16	5	no abstinence
	39	43	male	yes	15	28	4	no abstinence
Aguilar-Urbano et al	40	19	male	yes	not mentioned	not mentioned	1	not mentioned
	41	40	male	yes	34	6		not mentioned
Wild & Wilson	42	21	female	no	14	7	0	not mentioned
Bagdure et al	43	27	male	yes	21	5	6	yes

Author	No. of case	Age (years)	Sex	Bathing in hot water	Age of cannabis onset (years)	Years of consumption before onset of vomiting	Years of consumption before diagnosis	Improvement with abstinence
Nicolson et al	44	27	male	yes	17	7	9	no abstinence
	45	22	female	yes	17	5	5	no abstinence
	46	24	male	yes	14	8	10	not mentioned
	47	20	female	yes	16	2.5	3.5	yes
Torka & Sharma	48	20	male	yes	18	2	2	not mentioned
	49	42	male	yes	39	3m	3m	yes
Cox et al	50	28	male	yes	18	10	10	yes
Achanta & Kelkhoff	51	20	male	not mentioned	16	20	not mentioned	yes
Morris & Fisher	52	20	female	yes	16	20	‹1	yes
Fabries et al	53	28	female	not mentioned	21	7	not mentioned	yes
	54	40	male	not mentioned		›10	not mentioned	yes
	55	24	male	not mentioned	not mentioned	not mentioned	not mentioned	yes
	56	19	female	not mentioned	15	4	not mentioned	yes
	57	22	male	not mentioned	10	12	not mentioned	yes
	58	35	female	not mentioned	not mentioned	not mentioned	not mentioned	yes
	59	27	female	not mentioned	not mentioned	not mentioned	not mentioned	yes
Hickey, Ribaud &Puidupin	60	34	male	yes	1	14	10	not mentioned
Kraemer; La Hoz & Willig	61	42	male	yes	not mentioned	not mentioned	not mentioned	not mentioned
Sofka & Lerfald	62	28	male	yes	17	7	11	no abstinence
	63	32	male	yes	19	11	2	no abstinence
	64	23	female	yes	15	7	1	no abstinence
	65	22	male	yes	13	9	6m	yes
Hopkins &Gilchrist	66	30	male	yes	13	not mentioned	not mentioned	yes
Enuh. Chin & Nfonoyim	67	47	male	yes	17	not mentioned	not mentioned	not mentioned
Mohammed et al	68	26	male	yes	24	1.5	1.5	yes
Roca-Pallín et al	69	36	female	yes	31	5	5	yes
Williamson et al	70	39	male	yes	19	33	6	yes
	71	19	male	yes	17	not mentioned	not mentioned	yes
Gupta, Ojo &Muruthettuwegama	72		female	yes	not mentioned	not mentioned	not mentioned	yes
Woods et al	73	37	male	yes	not mentioned	14	14	no
Habboushe & Sedor	74	25	male	yes	17	not mentioned	not mentioned	no
Fleig & Brunkhorst	75	28	male	yes	17	10›	‹1	no abstinence
Barmstedt & Dissmann	76	36	male	yes	12	not mentioned	not mentioned	not mentioned
Bonet, Chang & Schebaum	77	27	male	yes	16	not mentioned	not mentioned	yes
Lieb et al	78	29	female	yes	18	not mentioned	not mentioned	yes
Stuijvenberg, Ramaekers & Bijpost	79	22	male	not mentioned	12	3	7	yes
	80	22	female	yes	not mentioned	not mentioned	1	yes
	81	25	female	yes	not mentioned	not mentioned	not mentioned	not mentioned
Sannarangappa & Tan	82	34	male	yes	19	5	10	no abstinence
Wolfhagen	83	46	male	si	10	19	8	not mentioned

Conclusions

The effects of exogenous cannabinoids on the organism are still not known in their entirety. In the context of the high prevalence of cannabis consumption in Spain, however, we consider it necessary to raise the awareness of healthcare providers about the existence of this syndrome, since a timely diagnosis can avoid unnecessary examinations, which are unpleasant for the patient and costly for the healthcare system.

Further studies are necessary in order to understand the pathophysiological mechanism by which cannabis induces hyperemesis.

Given that the treatment of acute CHW episodes is symptomatic, and that hot bathing constitute a learned behavior which relieves the symptoms of nausea and vomiting, we propose that this behavior is accepted as part of the treatment. For example, agreement could be reached with the patient, setting the number of baths per day and the most suitable temperature to prevent health risks to the patient during the acute phase of CHS.

Limitations of the study

In the summary of cases published to date, articles were included which were written in a variety of formats, with some of them omitting information included in Table 6. When studying the data in this table, only those patients describing a feature in the respective publication were taken into account in its analysis.

Conflict of Interests

The writers of this article declare no conflict of interests.

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