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PREDISPOSING FACTORS ASSOCIATED WITH CHRONIC SUBDURAL HEMATOMA IN ADULTS AND ELDERLY ADULTS SERVED IN THE NEUROSURGERY AND GERIATRICS SERVICE AT THE MARÍA AUXILIADORA HOSPITAL IN 2016-2020

FACTORES PREDISPONENTES ASOCIADOS A HEMATOMA SUBDURAL CRÓNICO EN ADULTOS Y ADULTOS MAYORES ATENDIDOS EN EL SERVICIO DE NEUROCIRUGÍA Y GERIATRÍA EN EL HOSPITAL MARÍA AUXILIADORA EN EL PERIODO 2016 – 2020

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ABSTRACT

Introduction: A common pathology in the Neurosurgery Service is chronic subdural hematoma (CSDH), affecting elderly male patients. It is an accumulation of blood that is located in the subdural space that can occur spontaneously or be the result of a head injury or other pathologies such as high blood pressure (HBP), type 2 diabetes mellitus (DM2), alcoholism, or external factors such as head trauma (CT) and consumption of platelet antiaggregants. **Objective:** To determine how predisposing factors are associated with CSDH in adults and older adults treated at the Neurosurgery and Geriatrics Service at the María Auxiliadora Hospital (HMA) in 2016-2020. **Methods:** An analytical, observational, retrospective study of cases and controls was carried out through data collection from medical records. **Results:** Association was found with age 60 to 96 years (adjusted OR = 2,52; 95% CI: 1,43 - 4,80), male gender (adjusted OR = 4,10; 95% CI: 2,30 - 7,60), alcohol consumption (adjusted OR = 3,06; 95% CI: 1,06– 8,83), hypertension (adjusted OR = 2,51; 95% CI: 1,16– 5,43), DM2 (Adjusted OR = 2,49; 95% CI: 1,03–6,01) and CT (adjusted OR = 3,35; 95% CI: 1,87– 6,03). **Conclusions:** The sociodemographic factors age and sex are associated with HSDC. Alcohol consumption, hypertension, DM2, and history of TC are associated with HSDC.

Keywords: Predisposing factors; Chronic subdural hematoma; adult; Elderly. (Source: MeSH NLM).

RESUMEN

Introducción: Una patología común en el Servicio de Neurocirugía es el hematoma subdural crónico (HSDC) que afecta principalmente a pacientes varones de edad avanzada. Es una acumulación de sangre que se localiza en el espacio subdural que puede ocurrir espontáneamente o ser el resultado de una lesión en la cabeza u otras patologías como hipertensión arterial (HTA), diabetes mellitus tipo 2 (DM2), alcoholismo o factores externos como un trauma craneal (TC) y consumo de antiagregantes plaquetarios. **Objetivo:** Determinar de qué forma los factores predisponentes se asocian a HSDC en adultos y adultos mayores atendidos en el Servicio de Neurocirugía y Geriatría en el Hospital María Auxiliadora (HMA) en el periodo 2016 – 2020 **Métodos:** Se realizó un estudio analítico, observacional, retrospectivo de casos y controles a través de recolección de datos de las historias clínicas (HCs). **Resultados:** Se encontró asociación con la edad 60 a 96 años (OR ajustado = 2,52; IC95%: 1,43 – 4,80), sexo masculino (OR ajustado = 4,10; IC95%: 2,30 – 7,60), consumo de alcohol (OR ajustado = 3,06; IC95%: 1,06– 8,83), HTA (OR ajustado = 2,51; IC95%: 1,16– 5,43), DM2 (OR ajustado = 2,49; IC95%: 1,03– 6,01) y TC (OR ajustado = 3,35; IC95%: 1,87– 6,03). **Conclusiones:** Los factores sociodemográficos edad y sexo están asociados al HSDC. El consumo de alcohol, HTA, DM2 y antecedente de TC están asociados a HSDC.

Palabras claves: Factores predisponentes; Hematoma subdural crónico; Adulto; Adulto mayor. (Fuente: DeCs BIREME).

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INTRODUCTION

HSDC is one of the most common clinical conditions in neurosurgery [1]. It mainly affects elderly patients in which there is a higher prevalence. In addition, the mortality of this disease is high and markedly reduces life expectancy [2].

DCHS is defined as an accumulation of blood, with traces of its degradation, located in the subdural space [3]. It can occur spontaneously or be the result of a head injury or other pathologies [4]. Clinically it can present itself in various ways; it is recognized as the "great simulator" of several neurological diseases. Trepanation is currently a conventional neurosurgical procedure for the treatment of CSDH [5]. According to the World Health Organization (WHO) data, the incidence may double in people over 65 years of age between 2010 and 2050. More frequently in males, with a ratio of 3:1 in the age group [6].

Intrinsic factors: include age, walking, and mobility disorders, balance problems, poor health, emotional disorders, and effects of medicines. Extrinsic factors such as: unknown environments, the use of inappropriate footwear and poor lighting [7]. The overall incidence of HSDC has been reported to range from 1,7 to 20,6/100 000 person-years, with a significantly higher incidence in the elderly. A trend towards an increase in incidence has been observed, which can be attributed to the aging of the general population as a result of an increase in life expectancy [8].

According to data from the National Institute of Statistics and Informatics (INEI) of Peru, the number of ma Seniors in 2020 increased to 4,1 million [3].

The mean age of patients with HSDC has been reported as 60,4 years in India, 64,3 years in Brazil, 68,9 years in Switzerland, 69,0 years in Korea, 69,3 years in Canada, 71,4 years in Germany 72,7 years in Spain. According to patient age (in decades), the analysis showed that 60-year-old patients were the most common in Brazil [9].

The elderly population is increasing, and there are several risk factors, it is necessary to identify each one to reduce the prevalence of this diagnosis. In the elderly, due to advanced age, falls, traffic accidents and different alterations such as gait, vision, and state of consciousness are more frequent and a vulnerable population. The evaluation of these risk factors is very important for future research. Cases have been observed in adults, so it is necessary to identify and associate them with predisposing factors.

METHODS

Type and design
Retrospective, observational, analytical case-control study, based on HCs from 2016 to 2020.

Population and sample
Patients aged between 33 and 96 years who were treated at the HMA, in addition to meeting the criteria for inclusion and exclusion. Information was collected from the HCs of patients with and without HSDC in the Neurosurgery and Geriatrics Services during the period 2016 - 2020. With a sample size of 220 HCs in accordance with our inclusion criteria. The sampling was non-probabilistic.

Statistical analysis
The statistical software SPSS version 27 was used. A data file was first created in Microsoft Excel, which was then exported to SPSS. The data entry was verified in such a way that no errors or omissions were made during the entry of the information. Qualitative variables were analyzed by creating frequency tables and calculating percentages. For the bivariate analysis, we used a double-entry table or contingency tables for the bivariate analysis to analyze two qualitative variables, calculating frequencies and percentages. The crude Odds Ratio (OR) was used to verify the association between variables, accompanied by their confidence intervals. Finally, the binary logistic regression model was used to identify the associated risk factors, calculating adjusted ORs accompanied by their confidence intervals. All tests of statistical significance were tested at the 0,05 level.

Ethical aspects
This study is based on the analysis of information extracted from the HCs of the HMA in the period 2016-2020. With approved permits. In addition, the research project has been evaluated and approved by the Ethics Committee of Ricardo Palma University and the Ethics Committee of the HMA.

RESULTS

In this research work, 218 patients from the Neurosurgery and Geriatrics Service were analyzed, of which 109 corresponded to patients with CSDH and 109 controls. The average age of the patients was 64 years, while in the cases, it was 68 years and the controls 60 years.

Table 1. Distribution of the sample according to year

Year	Frecuency	Percentage
2016	33	15,1
2017	39	17,9
2018	45	20,6
2019	48	22,0
2020	53	24,3

Concerning Table 1, it is observed that for the year 2016 information was collected from 15,1% (33) HCs. In 2017 there were 17,9% (39) HCs. In 2018, 20,6% (45) were collected. In 2019, 22% (48) were collected and in 2020, 24,3% (53) CHs were collected.

Table 2. Sociodemographic factors of patients treated at the Neurosurgery and Geriatrics Service with and without chronic subdural hematoma. 2016 – 2020

Sociodemographic factors	Frecuency	Percentage
Age		
34-59	79	36,2
60-96	139	63,.8
Sex		
Male	129	59,2
Female	89	40,8

Table 2 shows that 63,8% (139) of the patients presented an age between 60 and 96 years; 59,2% (129) were male.

Table 3. Clinical Factors of Patients served in the Neurosurgery and Geriatrics service with and without chronic subdural hematoma. 2016 – 2020

Sociodemographic factors	Frecuency	Percentage
Alcohol		
Yes	19	8,7
No	199	91,3
Arterial hypertension		
Yes	35	16,1
No	183	83,9
MD2		
Yes	26	11,9
No	192	88,1
Head trauma		
Yes	77	35,3
No	141	64,7

Regarding the clinical factors (Table 3), 8,7% (19) of the patients were alcohol consumers, 16,1% (35) had hypertension, 11,9% (26) had DM2, and 35,3% (77) had CT.

Table 4. Sociodemographic Factors Associated with Chronic subdural hematoma in patients served at maria auxiliadora hospital. 2016 – 2020

Sociodemographic factors	Chronic subdural hematoma		p value a/
	Yes n (%)	No n (%)	
Age			
34-59	28 (25,7)	51 (46,8)	0,001
60-96	81 (74,3)	58 (53,2)	
Sex			
Male	82 (75,2)	47 (43,1)	
Female	27 (24,8)	62 (56,9)	0,000

Regarding sociodemographic factors, they showed a statistically significant association with age (p value = 0,001) and gender (p= <0,001) as a predisposing factor for HSDC.

Table 5. Clinical factors associated with chronic subdural hematoma in patients treated at the Maria Auxiliadora Hospital. 2016 – 2020

Clinical factors	Chronic subdural hematoma		p value a/
	YES n (%)	No n (%)	
Alcohol			
Yes	14 (12,8)	5 (4,6)	0,031
No	95 (87,2)	104 (95,.4)	
Arterial hypertension			
Yes	24 (22,0)	11 (10,1)	0,016
No	85 (78,0)	98 (89,9)	
MD2			
Yes	18 (16,5)	8 (7,3)	0,037
No	91 (83,5)	101 (92,7)	
Head trauma			
Yes	53 (48,6)	24 (22,0)	0.000
No	56 (51,4)	85 (78.0)	

According to the clinical factors analyzed (Table 5), all presented a statistically significant association with the HSDC. Alcohol consumption (p=0,031), hypertension (p=0,016), DM2 (p=0,037) and finally TC (p <0,001) are associated with SHDC.

Table 6. Crude and adjusted OR of sociodemographic factors and chronic subdural hematoma in patients treated at Hospital María Auxiliadora, 2016 – 2020

Sociodemographic factors	Crude OR	IC95%	P value	Adjusted OR	IC95%	P value
Age						
60-96	2,54	1,44 -4,50	0,001	2,52	1,43 - 4,80	0,002
34-59	1,00			1,00		
Sex						
Male	4,01	2,25 - 7,13		4,10	2,30 - 7,60	<0,001
Female	1,00		0,000	1,00		

The sociodemographic variables analyzed resulted in a statistically significant association with the HSDC. Patients between the ages of 60 and 96 years have a 2,52-fold increased risk of CSDH compared to patients between the ages of 34 and 59 years (adjusted OR = 2,52; 95% CI: 1,43 - 4,80), thus Likewise, male patients had a 4,10 times higher risk of CSDH compared to female patients (adjusted OR = 4,10; 95% CI: 2,30 - 7,60).

Table 7. Crude and adjusted OR of clinical factors and chronic subdural hematoma in patients treated at Hospital María Auxiliadora, 2016 – 2020

Clinical factors	Crude OR	IC95%	P value	Adjusted OR	IC95%	P value
Alcohol						
Yes	3,06	1,06 - 8,83	0,031	3,06	1,06 - 8,83	0,038
No	1,00			1,00		
HTA						
Yes	2,51	1,16 - 5,43	0,016	2,51	1,16 - 5,43	0, 019
No	1,00			1,00		
DM2						
Yes	2,49	1,03 - 6,01	0,037	2,49	1,03 - 6,01	0,041
No	1,00			1,00		
Head trauma						
Yes	3,35	1,86 - 6,03	<0,001	3,35	1,86 - 6,03	<0,001
No	1,00					

Finally, the clinical variables analyzed presented a statistically significant association. The variables alcohol consumption, hypertension, DM2 and TC presented a higher risk of CSDH, with 3,06 (adjusted OR = 3,06; 95% CI: 1,06 –8,83), 2,51 (adjusted OR = 2, 51; Ci95%: 1,16–5,43) and 2,49 (adjusted OR = 2,49; CI95%: 1,03–6,01) respectively. Lastly, TC represents a 3,35-fold greater predisposing risk for developing CSDH (adjusted OR = 3,35; 95% CI: 1,87–6,03).

DISCUSSION

In this study, a statistically significant association of HSDC with the sociodemographic characteristics analyzed was found. Being between 60 and 96 years old had a higher risk of CAH compared to patients aged 34 to 59 years; this is consistent with studies such as the one by Toi et al.[9] who shows in his study that the most frequent age range is the ninth decade of life, Gallardo et al.[10] highlights patients older than 60 years (95%), García-González et al.[11] report that the incidence of patients was higher between 60 and 80 years; similarly in the study by Kostic et al.[12] the mean age in the HSDC group is 74,5 years ± 8,2 years.

In the work of Vanegas et al.[13] patients older than 65 years predominate, in the study by Mendoza et al.[14] patients older than 60 years (70,7%), while Julcamoro[15] reports a mean age of 71 years. According to the literature, HSDC is more common in older adults due to the normal shrinkage of the brain that occurs with age; this shrinkage stretches and weakens the emissary veins that are more likely to rupture in older adults, even after a minor CT scan. Rodríguez-Venegas et al.[16] report a lower age range, from 19 to 33 years.

Being male represented a higher risk of developing HSDC. Garcia-González et al.[11] finds a male-female ratio of 4:1 and Castro-Rodríguez et al.[2] a male-to-female ratio of 1:1.1[2].

Vanegas et al.[13], Gelabert-González et al.[17] and Sikahall Meneses et al.[18] report more cases of HSDC in males. The same predominance of the male sex is found by Santos et al.[19] (70,4%), Motoie et al.[20] (80,2%), Jimenez et al.[21] (75%), Rule et al.[22] (81,5%) and Mendoza (66,3%)[14]. Finally, Arteta[23] shows that male gender is a risk factor for developing HSDC.

In this study, a statistically significant association of DCHS with the clinical characteristics analyzed was found; being a consumer of alcohol represented a higher risk of HSDC. The aforementioned is corroborated with the results reported by other authors [11-13]. Esquivel et al.[24] finds that alcohol consumption is present but in a lower percentage (5,3%), while Regla et al.[22] reports it in 33,3%[22].

The literature shows that alcohol consumption causes death and disability at a relatively early age; In addition, its effects are generalizable at all ages, altering physiology and neuropsychological functions; it constitutes a risk factor for HSDC.

Having a history of high blood pressure (HBP) was shown to be a predisposing factor for SHDC. In the study by Kostic et al.[22] patients between 70-79 years of age diagnosed with CSDH had higher rates of AHT. Esquivel et al.[24] reports hypertension in 42,1%, while Arteta[23] finds that a history of hypertension is a predisposing factor.

Having a history of DM2 was a predisposing factor[24] for HSDC. Esquivel et al.[23] reports results similar to ours, unlike Arteta who did not find association.

History of CT was a predisposing factor for developing CSDH. Similar results are reported by Castro-Rodríguez et al.[2] who found this antecedent in 57% of patients. Kitya et al.[25] reports that most hematomas occurred as a result (60.5%) and Park et. al[26] to evidence that the intensity of the TC is related to larger concentrations of molecules in the HSDC.

Rodríguez-Venegas et al.[16] mild CT stands out in 72%, Vanegas et al.[13] in 96% and Rauhala et al.[27] documented CT in 59% of cases[27].

In the study by Jiménez[21] the most frequent risk factor for CSDH is CT (66,6%), Marshman et al.[28] reports that one of the risk factors was CT and Sikahall-Meneses et al.[18] that 92% had a history of CT. In the work of Regla et al.[22] predominated antecedents of TCThe Arteta[23] study shows the association with a history of CT. Similarly, Julcamoro[15] study shows a 70,7% of patients with CTI[15].

Regarding the CT scan, if the person suffers a fortuitous blow to the head, the bone moves quickly, but the brain has a different inertia and moves at a different speed and time. This causes these drainage veins to tighten. If the blow is strong enough and the veins are already tense due to the distance between the cerebral cortex and the bone, due to atrophy, these veins may rupture and the consequent hemorrhage may occur. The process of formation of the subdural hematoma begins.

CONCLUSIONS

The sociodemographic factors age and sex are associated with HSDC.

Alcohol consumption, hypertension, DM2 andSantecedent of TC are associated with HSDC.

It is recommended that care be prioritized in the elderly because they are exposed to falls. Alcohol consumption should be reduced as it is a triggering factor for hematoma. Patients with AHT should have regular check-ups to keep their pressures within normal parameters. In the case of diabetic patients, maintain adequate treatment and respective glycemic control. Finally, in the case of CT, the necessary imaging tests must be performed to avoid future complications.

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