Relative prevalence of anxiety and depression in cubital tunnel syndrome patients and associated factors

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Abstract

Purpose: Cubital tunnel syndrome (CuTS) is the second most common peripheral entrapment neuropathy. This study aimed to assess the prevalence of anxiety and depressive symptoms and explore associated factors among CuTS patients.

Methods: This is a cross-controlled study. We used the Hospital Anxiety and Depression Scale to assess the prevalence of depression and anxiety. We calculated the proportion of depression and anxiety symptoms and compared characteristics between groups. Univariate analysis and multivariate regression were carried out to identify variables that were independently associated with anxiety and depression.

Results: A total of 246 individuals diagnosed with CuTS were included. The results of the HADS demonstrated that 17.8% (n = 44) of the patients presented possible/probable depression, and 14.2% (n = 35) presented possible/probable anxiety. Logistic regression analysis revealed that diabetes Mellitus was independently associated with depression. And modified McGowan grade was independently associated with anxiety.

Conclusions: Patients with cubital tunnel syndrome were at an increased risk of anxiety and depression. Abnormal mental states may have a negative impact in the course and outcome of the disease. Early screening for anxiety and depression in CuTS patients should be recommended.

Introduction

Cubital tunnel syndrome (CuTS) is the second most common peripheral nerve entrapment syndrome, which is a condition caused by compression of the ulnar nerve within the cubital tunnel at the elbow[1]. CuTS patients were often troubled by symptoms like tingling and pain in the small finger and ulnar half of the ring finger[2]. As the condition progresses, muscular weakening and muscular atrophy will occur [3]. Due to these symptoms, patients' life quality and the ability to continue in employment may be impacted.

Depression and CuTS are both highly prevalent conditions, specifically among women[4]. In the general population, the global prevalence for major depressive disorder is 4.4%, whereas for anxiety disorders it is 4.0% [5]. Mood disorders such as depression and anxiety will increase the pain perceived and worsen functional statuses[6]. Beleckas et al [7] confirmed that patients with upper extremity conditions were more frequently report anxiety and depression than the general population. For CuTS patients, most articles focus on the patient's disease's progress and few studies pay attention to patients' mental health status [8].

Therefore, It is important to assess the mental status of CuTS patients. This study aimed to establish the prevalence of anxiety and depression, and also to explore associated factors among CuTS patients.

Materials And Methods

Participants

Participants diagnosed with CuTS were recruited from the outpatient service of hand surgery department. The diagnosis of carpal tunnel syndrome was made using a combination of clinical assessment and nerve conduction studies. Clinical assessment included a history of initial presence with intermittent paresthesias, numbness, and tingling in the small finger and ulnar half of the ring finger [2]. According to the guidelines of the American Association of Electrodiagnostic Medicine [9], all patients were performed the nerve conduction studies. Confirmatory criteria included: (1) motor nerve conduction velocity (MNCV) across the elbow of less than 50 m/s, (2) an MNCV difference of greater than 10 m/s between the elbow segment and the forearm segment, (3) a decrease of the compound muscle action potential (CMAP) amplitude from below the elbow to above the elbow greater than 20%, suggesting a conduction block. Electrodiagnostic studies were performed by a specialist technician using a Dantec Keypoint Portable Nerve Conduction/EMG machine (Dantec Dynamics, Bristol, Bristol, UK) and reported by a consultant neurophysiologist. The specific process is shown in Figure 1.

Patients were selected based on one of the following criteria: (1) patients with subjective symptoms, no matter intrinsic muscle atrophy; (2) electrodiagnostic evidence support; and (3) age older than 18 years. Patients with one of the following criteria were excluded: (1) age < 18, (2) patients cannot provide written informed consent, (3) patients with other neuropathy, which was confirmed by electrophysiologically, (4) patients who had undergone previous treatments, such as splinting, steroid injection or CuTS release surgery, (4) a previous clinical diagnosis of anxiety, depression and other psychiatric disorder, (5) pregnant and lactating women.

Demographics and clinical evaluation

In this study, A self-administered questionnaire consisting of two parts was used. The first part included patients' demographic data (age, gender, educational level, marital status, job status and socioeconomic status). The second part included patients' clinic data (hypertension, hypertension, tobacco use, alcohol use, history of cancer, duration of symptoms). Age was determined as older = more than 50 years old and younger = less than 50 years old. Educational level was registered as university degree, Primary and middle degree and illiterate degree. Marital status was coded as married, single, widow, and divorced. Job status was registered as employed and unemployed. The socioeconomic status was recorded from the total number of the family income; it was determined as high = earning more than 10,000 RMB, medium = earning 50,001 to 10,000 RMB per year, or low = earning 1 to 5000 RMB per year. Duration of symptoms was determined as long= more than 2 years, short = less than 2 years.

CuTS patients were asked to complete a Quick Disabilities of the Arm, Shoulder, and Hand (DASH) questionnaire to assess the hand function (0= no disability, and 100= total disability) [10, 11]. Based on the modified McGowan grade[12], all CuTS patients were classified into 4 groups. Grade I: Subjective symptoms, no abnormal objective findings; Grade IIa: Good intrinsic strength (4/5), no detectable muscle atrophy; Grade IIb: Fair intrinsic strength (3/5), detectable muscle atrophy; Grade III Profound sensory and motor disturbances with marked intrinsic atrophy.

We used the Hospital Anxiety and Depression Scale[13] to assess depression and anxiety symptoms. The Hospital Anxiety and Depression scale contain two scores: an anxiety subscale (HADS-A) and a depression subscale (HADS-D). Each subscale concludes seven questions. Scores of 11 or higher are indicative of a probable disorder, 8 to 10 points are possible cases, and 7 or less points mean no case. We classified individuals as being depressed or anxious (present cases, ≥8 points) or nondepressed/nonanxious (absent case, ≤7 points).

Statistical analyses

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS, version 25, Chicago, IL) for windows. The main study outcomes were the prevalence of anxiety and depression in CuTS patients and factors associated with anxiety and depression. A $p < 0.05$ was considered to be statistically significant. Then multiple logistic regression (Backword-Wald) was carried out to identify the variables that were independently associated with anxiety and depression among persons with CuTS. Results of logistic regression are expressed as odds ratios with 95% confidence interval (CI).

Results

Study population

From May 2011 to January 2017, 246 patients with cubital tunnel syndrome were recruited from the outpatient service of hand surgery department. All patients were confirmed by nerve conduction studies. The typical EMG pictures were shown in Figure 2. Women accounted for 73.2% (n = 180) of the patients. And 67.5% (n=166) of the patients have got primary and middle education. The mean age was 63.1 (SD, 3.8) years, 41.1% (n=101) of the patients were in medium socioeconomic level. Most patients were married (71.1%, n = 175) . 7.3% (n =18) of the patients reported tobacco use and 9.3% (n=23) of the patients reported alcohol use. The most frequent medical comorbidities were diabetes Mellitus (17.9%, n = 44) and hypertension (10.6%, n = 26). The average duration of symptoms was 23.9 (SD, 4.1) months.

Based on modified McGowan grade [12], all CuTS patients were classified into Grade I CuTS (n = 88), Grade IIa CuTS (n = 45), Grade IIb CuTS (n = 59), and Grade III (n = 54). The mean QuickDASH score was 48 (SD,4). The demographic and clinical characteristics included in this study are summarized in Table 1.

Prevalence of anxiety and depression

The results of the HADS demonstrated that 17.8% (n = 44) of the patients presented possible/probable depression, and 14.2% (n = 35) presented possible/probable anxiety. 5 patients had both possible/probable anxiety and depression.

Associated factors of depression and anxiety

The results of the univariate logistic analysis were summarized in Table 2. The factors that were associated with depression in CuTS patients were education (p = 0.001), job status (p = 0.001), diabetes

Mellitus (*p*=0.000). And the factors that were associated with anxiety in CuTS patients were diabetes mellitus (*p* = 0.011) , modified McGowan grade (*p* = 0.021) and hypertension (*p* = 0.024). These factors were shown in Figure 3.

Multivariable logistic analysis of univariate factors associated with depression and anxiety was shown in Table 3. Diabetes Mellitus was independently associated with depression (*p*<0.01). Modified McGowan grade was significantly associated with anxiety (*p*<0.01).

Discussion

Cubital tunnel syndrome (CuTS) is a condition caused by compression of the ulnar nerve within the cubital tunnel at the elbow [1]. The incidence rate of CuTS is 30.0 per 100 000 person-years [14]. The prevalence of anxiety and depression is increasing gradually these years. Among the general adult population in China, when assessed by the HADs scale, the prevalences of anxiety and depression were 5.3 and 7.2%, respectively. There have been many articles confirmed that chronic diseases, such as diabetes and asthma, tend to produce anxiety after a long period of illness [15]. Before the medical intervention, CuTS patients were often troubled by abnormal feeling for a long time. However, few studies pay attention to the prevalence of depression and anxiety in CuTS patients.

In this cross-sectional study, we assessed the prevalence of anxiety and depression and their associated demographic and clinical features in CuTS patients. Among all patients, 17.8% of individuals had significant symptoms of possible/probable depression disorder, and 14.2% had symptoms of the possible probable depressive disorder according to the cutoff points of the HADS. Our findings are similar to Beleckas' reported [7], who confirmed that patients with upper extremity conditions were more frequently report anxiety and depression than the general population. This evidence along with our results suggests the need for early psychiatric evaluation of CuTS patients to identify the presence of depression and depression.

Logistic regression analysis revealed that diabetes Mellitus was independently associated with depression. diabetes Mellitus can cause small fiber neuropathy in patients[16], which will form a significantly painful condition in a patient's body. Therefore, it is possible that the small fiber neuropathy worsens the symptoms of CuTS, and the cooperative effect will increase the risk of depression.

In our study, the modified McGowan grade was independently associated with anxiety. Modified McGowan grade classified CuTS patients into 4 groups. Grade III means patients with profound sensory and motor disturbances and marked intrinsic atrophy. We also found that the prevalence of anxiety was also higher in modified McGowan grade III group CuTS patients. On the one hand, patients with anxiety tend to report worse hand function. On the other hand, those with worse hand function worry more about their conditions, which could worsen their anxiety symptoms. This finding confirmed that anxiety was associated with higher symptom burden and worse physical functioning. Therefore, early intervention and stopping the progression of the disease was of great significance to CuTS patients.

There are some limitations of our study. Firstly, the sample was a small sample size. Secondly, The use of HADS is limited by the fact that this is a screening tool and that anxiety and depression should be confirmed with clinical diagnosis. Thirdly, a small number of participants were illiterate that could have affected the comprehension of the questionnaires presented to those participants.

Conclusion

These results indicate that patients with CuTS have an increased risk of depressive and anxiety symptoms. Depression and anxiety are known to influence treatment adherence, health behaviors, and perceived health. Therefore, when accepted the CuTS patient, we should pay
attention to their mental state. Explaining the conditions patiently and eliminating the misconceptions about conditions. A multi-disciplinary approach is needed to best treat both the psychological and physical consequences of CuTS disease.

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Declarations

ETHICAL APPROVAL

The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. This study complied with the Declaration of Helsinki and was approved by Ethics Committees of the Third Hospital of Hebei medical university. All patients provided written informed consent.

CONSENT FOR PUBLICATION

The authors have no interests ethical, legal and financial conflicts related to the article. All authors read and approved the manuscript to publish.

DATA AVAILABILITY STSTEMENT

All of the materials were provided by the Third Hospital of Hebei medical university, and anyone can obtain the materials with appropriate reasons.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

AUTHOR CONTRIBUTIONS

(I) Conception and design: Xinzhong shao, Siming Jia

(II) Administrative support: Xiaoying Shi, Siming Jia

(III) Provision of study materials or patients: Guanglian Liu, Li Wang

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(V) Data analysis and interpretation: Xiaoran Zhang, Xulin Ma, Jia Li

(VI) Manuscript writing: All authors

(VII) Final approval of manuscript: All authors

Tables

Table 1. Demographic and clinical characteristics of study sample (N=246)

Characteristics	
Age (year)	63.1+3.8
Gender, n (%)	
Male	66(26.8)
Female	180(73.2)
Marital status, n (%)	
Married	175(71.1)
Single	1(0.4)
Divorced	57(23.1)
Widowed	13(5.2)
Education, n (%)	
University	55(22.3)
Primary and middle	166(67.5)
Illiterate	25(10.1)
Job status, n (%)	
Unemployed (%)	31(12.6)
Employed	215(87.4)
Socioeconomic status, n (%)	
High	24(9.7)
Medium	101(41.1)
Low	121(49.2)
Tobacco use, n (%)	18(7.3)
Exceeding permitted alcohol limit, n (%)	23(9.3)
Hypertension, n (%)	44(17.9)
Diabetes mellitus, n (%)	26(10.6)
History of cancer , n (%)	1(0.4)
Duration of symptoms (months)	23.9±4.1
QuickDASH score	48±4

Modified McGowan grade, n (%)

Grade I CTS	88(35.8)
Grade IIa CTS	45(18.2)
Grade IIb CTS	59(23.9)
Grade III CTS	54(21.9)

Table 2. Demographic and clinical factors association with anxiety and depression

	N	Depression			Anxiety		
		Present (n=44)	Absent (n=202)	*P* value	Present (n=35)	Absent (n=211)	*P* value
Demographic characteristics							
Age, n (%)							
>50 years old	181	31(70.5)	150(74.3)		28(80)	153(72.5)	
≦50 years old	65	13(29.5)	52(25.7)	0.604	7(20)	58(27.5)	0.352
Gender, n (%)							
Male	66	16(36.4)	50(24.8)		5(14.3)	61(28.9)	
Female	180	28(63.6)	152(75.2)	0.115	30(85.7)	150(71.1)	0.071
Marital status, n (%)							
Married	175	30(68.2)	145(71.8)		23(65.7)	152(72.0)	
Single	1	0	1 0.5		0	1(0.4)	
Divorced	57	10(22.7)	47(23.3)		9(25.7)	47(22.2)	
Widowed	13	4(9.1)	9(4.5)	0.624	3(8.5)	10(4.7)	0.733
Education, n (%)							
University	55	19(43.2)	36(17.8)		6(17.1)	49(23.2)	
Primary and middle	166	21(47.7)	146(71.8)		25(71.4)	141(66.8)	
Illiterate	25	4(9.1)	21(10.4)	0.001*	4(11.4)	21(9.9)	0.721
Job status, n (%)							
Unemployed (%)	31	12(27.3)	19(9.4)		5(14.3)	26(12.3)	
Employed	215	32(72.7)	183(90.6)	0.001*	30(85.7)	185(87.6)	0.746
Socioeconomic status, n (%)							
High	24	8(18.2)	16(7.9)		3(8.6)	21(10)	
Medium	101	15(34.1)	86(42.6)		10(28.6)	91(43.1)	
Low	121	21(47.7)	100(49.5)	0.103	22(62.9)	99(46.9)	0.206
Clinical							

characteristics

Diabetes mellitus, n (%)	44	18(40.9)	26(12.9)	0.000*	11(31.4)	33(15.6)	0.024*
Hypertension, n (%)	26	7(15.9)	19(9.4)	0.204	8(22.9)	18(8.5)	0.011*
Tobacco use, n (%)	18	4(9.1)	14(6.9)	0.618	4(11.4)	14(6.6)	0.313
Alcohol use, n (%)	23	6(13.6)	17(8.4)	0.281	4(11.4)	19(9.0)	0.648
History of cancer , n (%)	1	0	1(0.4)	0.75	1(2.8)	0	0.85
Duration of symptoms , n (%)							
>2 years	124	25(56.8)	99(49)		18(60)	106(37.6)	
≦2 years	122	19(43.2)	103(51)	0.348	17((40)	105(62.4)	0.896
QuickDASH score		45±2	52±3	0.401	49±4	63±2	0.306
Modified McGowan grade, n (%)							
Grade I CTS	88	24(54.5)	64(33.7)		14(40)	74(35.1)	
Grade IIa CTS	45	0	45(22.3)		0	45(21.3)	
Grade IIb CTS	59	11(25)	48(23.8)		12(34.3)	47(22.3)	
Grade III CTS	54	9(20.5)	45(22.3)	0.003*	9(25.7)	45(21.3)	0.021*

Chi-squared test was used, * $P<0.05$

Table 3. Logistic regression for variables associated with anxiety and depression

	Variable	β	Odds ratio	95% CI	p value
Depression	Job status	-0.542	0.582	0.147-2.298	0.440
	Education	0.627	1.871	0.657-5.332	0.241
	Modified McGowan grade	-0.429	0.651	0.405-1.045	0.076
	Diabetes Mellitus	2.082	8.017	1.972-32.591	0.004*
Anxiety	Modified McGowan grade	-0.533	0.587	0.378-0.911	0.017*
	Diebettes millitus	0.799	2.222	0.499-9.894	0.295
	Hypertension	1.378	3.965	0.804-19.568	0.091

Multivariable logistic analysis was used, * *P*<0.05

Figures

Flow chart:
- Volunteers with abnormal feeling
- Identifed by nerve conduction studies
- 246 CuTS patients took a HADS text
  - Normal mental status → Patiens received therapy according to the guideline
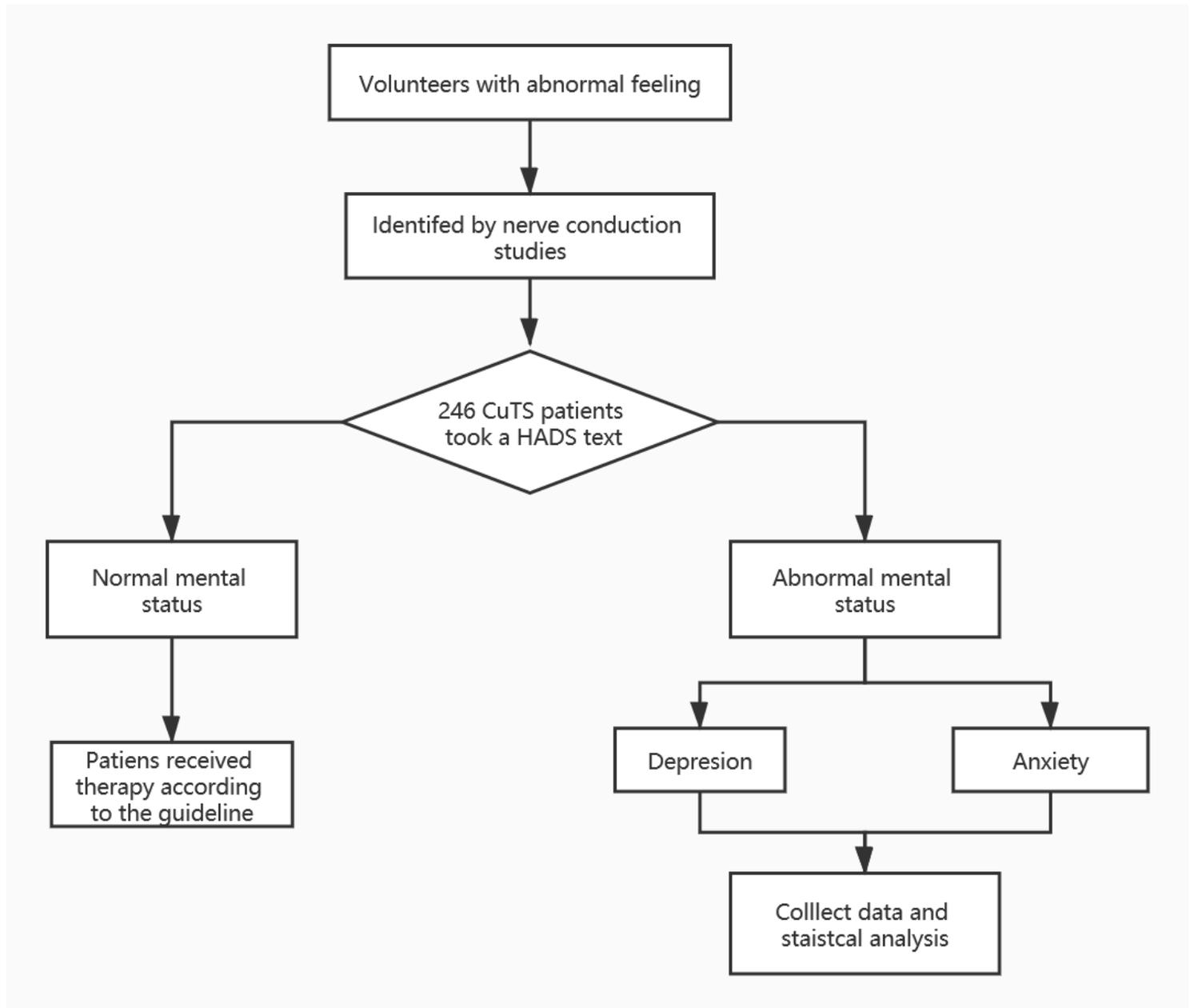 - Abnormal mental status → Depresion / Anxiety → Colllect data and staistcal analysis

Figure 1

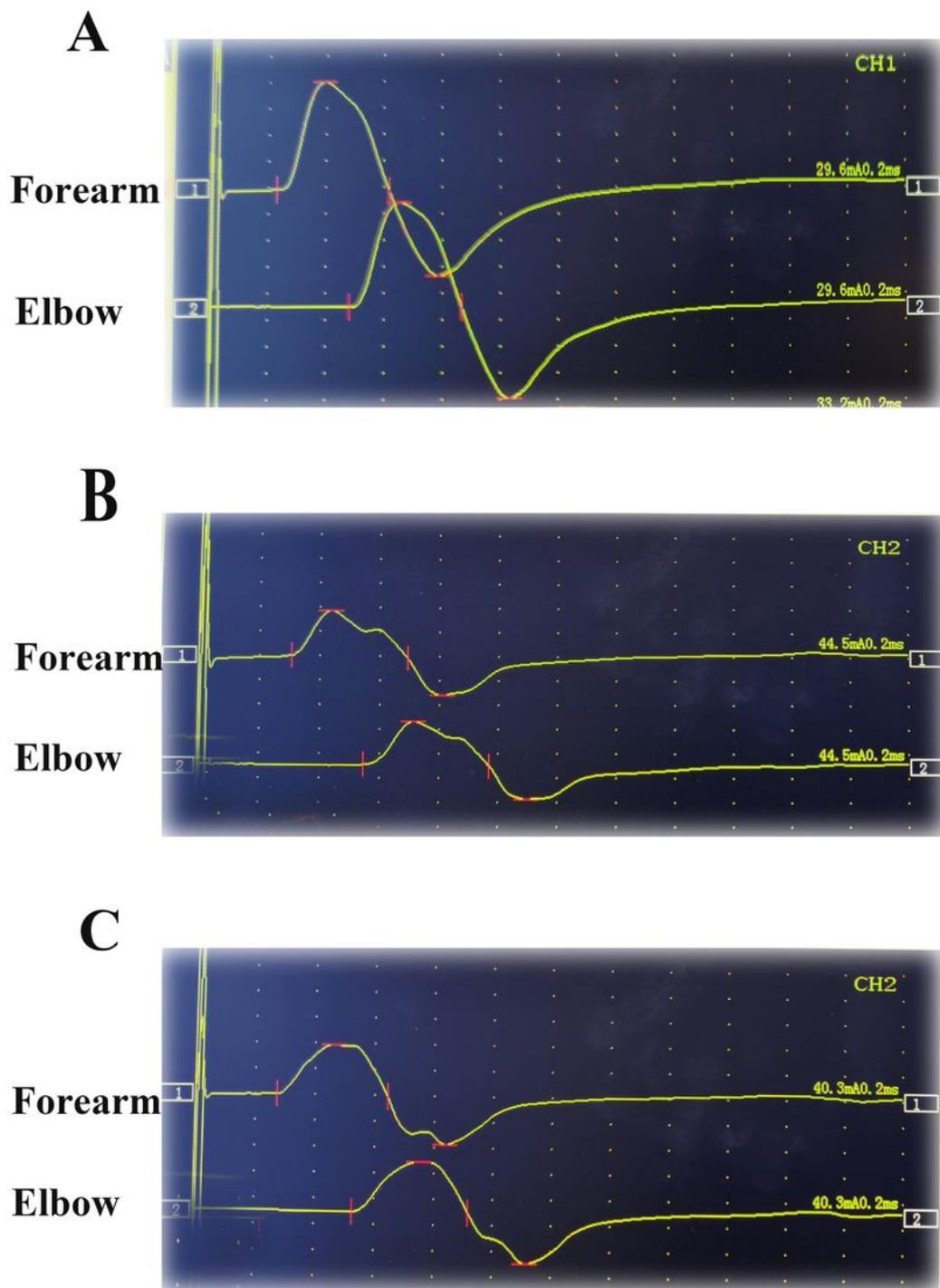Flow chart of patients with CuTS underwent HADS text

Figure 2

The picture of sample electrodiagnostic evidence of CuTS. A: patient with CuTS but without depression and anxiety symptoms. B: patient with both CuTS and depression symptoms. C: patient with both CuTS and anxiety symptoms.
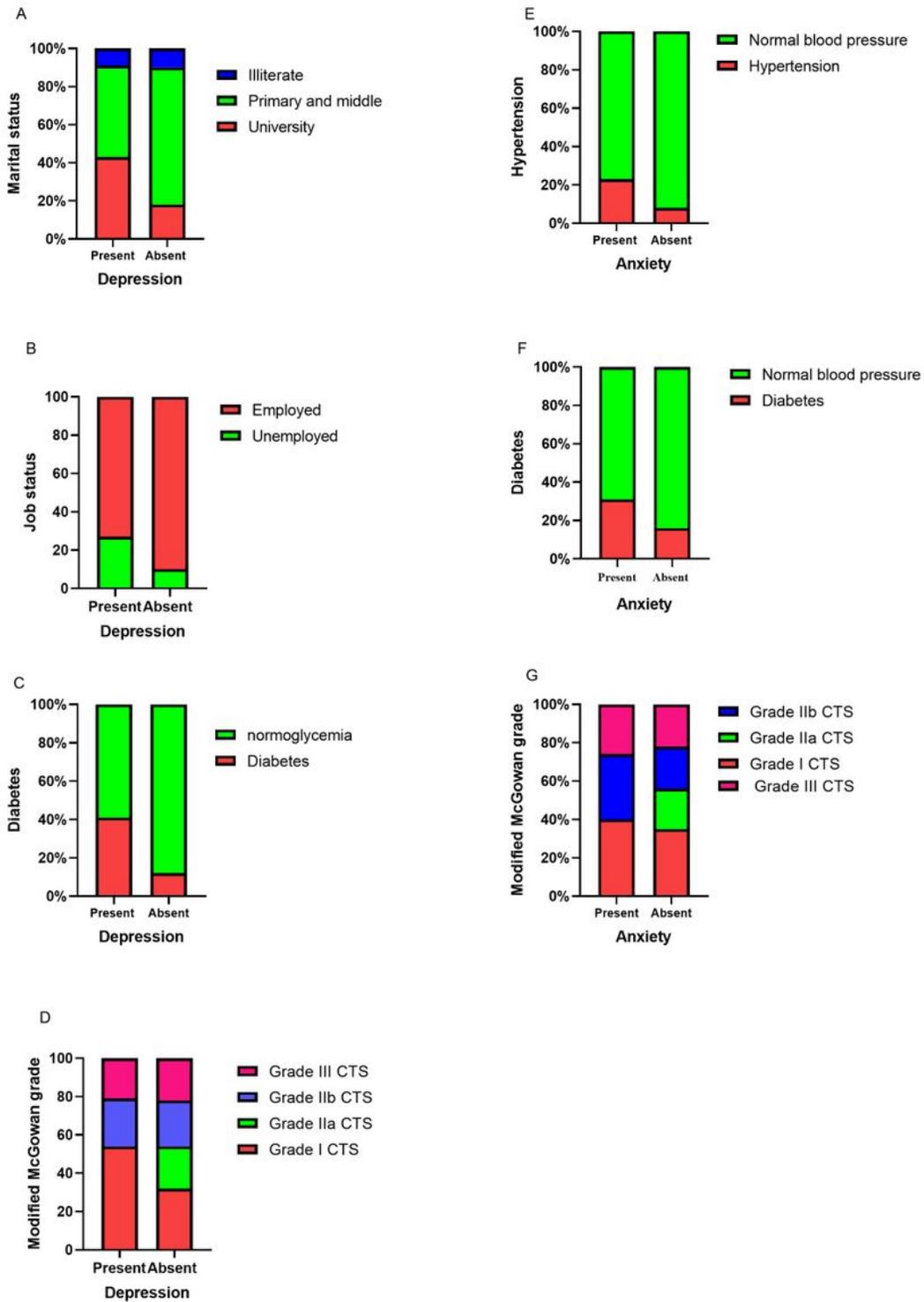
Figure 3

Factors that were associated with depression in CuTS patients A: marital status, B: job status, C diabetes mellitus D: modified McGowan grade: Factors that were associated with anxiety in CuTS patients, E: hypertension, F: diabetes mellitus, G: modified McGowan grade.