

**MODERN APPROACHES TO DIAGNOSIS AND TREATMENT OF VERTEBRAL ARTERY
SYNDROME WITH CONSIDERATION OF GENDER**<https://doi.org/10.5281/zenodo.18200350>**Orinov Muso Boltaevich****Saidov Sukhrob Rustamovich***Bukhara State Medical Institute named after Abu Ali Ibn Sino*

Abstract: *The study results allowed analysis of clinical, cognitive, psycho-emotional, and autonomic dysfunction in patients with vertebral artery syndrome (VAS), taking into account gender, disease stage, and psychotype. Women exhibited more pronounced cognitive and psycho-emotional impairments, with higher levels of anxiety and depression compared to men, whereas men primarily demonstrated motor and hemodynamic disturbances. On the functional stage (Group 1), mild to moderate dizziness was more common, while on the organic stage (Group 2), severe dizziness, pain syndrome, and neck disability index (NDI) scores were significantly higher ($p < 0.01$). Analysis of PAQ and COMPASS-31 scales revealed gender role and autonomic symptom differences, with the sympathetic component and total scores in the feminine psychotype being 1.16–1.24 times higher than in men ($p < 0.05$). These findings emphasize the importance of individualized diagnostic and rehabilitation strategies for VAS patients, considering gender, disease stage, and psychotype.*

Keywords: *vertebral artery syndrome, gender, cognitive function, psycho-emotional state, NDI, DHI, PAQ, COMPASS-31, functional stage, organic stage, psychotype, autonomic dysfunction.*

Relevance: Vertebral artery syndrome (VAS) is an ischemic syndrome associated with vertebrobasilar blood flow, in which the clinical manifestations and severity often exhibit gender-related characteristics. In particular, studies have shown that in women, VAS is frequently associated with cognitive and psycho-emotional impairments, with higher levels of anxiety and depression compared to men (Orinov et al., 2026; Saidov et al., 2025). This phenomenon is primarily explained by differences in hormonal status and sympathetic-adrenal system activity (Smith & Jones, 2020). In men, VAS is more often associated with neurovascular morphological changes, including arterial stenosis, deformities, and the development of vertebrobasilar collateral pathways (Lee et al., 2019; Kim et al., 2018). Furthermore, cognitive assessment scales such as MoCA and MMSE indicated that women exhibited the most pronounced cognitive decline and psycho-emotional disturbances at the organic stage, whereas men predominantly demonstrated motor and hemodynamic impairments (Orinov et al., 2026).

Modern neuroimaging methods, including MRI, MR-angiography, and Doppler ultrasound (USDG), allow consideration of gender-specific characteristics in the diagnosis of vertebral artery syndrome (VAS). For example, in women, minor stenoses and hypoperfusion are more often associated with cognitive and psycho-emotional impairments, whereas in men, stenoses $\geq 70\%$ and the development of collateral blood pathways primarily affect motor function and hemodynamic disturbances (Park et al., 2021; Orinov & Saidov, 2025).

Treatment and rehabilitation strategies also differ by gender. Women benefit more from cognitive-evaluative and stress-reduction therapeutic approaches aimed at stabilizing psycho-emotional status (HADS, CBT, mindfulness interventions) (Brown et al., 2020), while men respond better to physiotherapy, interventions to improve vertebrobasilar blood flow, and pharmacological correction targeting motor and hemodynamic function (Lee et al., 2019; Kim et al., 2018).

Moreover, studies have shown that individualized rehabilitation models that account for gender differences can significantly improve overall functional outcomes (Orinov et al., 2026; Smith & Jones, 2020). This emphasizes the need for comprehensive assessment of cognitive, psycho-emotional, and motor functions in VAS patients and the implementation of gender-specific therapeutic approaches.

In the evaluation of VAS with a gender perspective, the Dizziness Handicap Inventory (DHI) scale revealed that in the functional stage (Group 1), mild dizziness was observed in 42 patients (42%), moderate dizziness in 40 patients (40%), and severe dizziness in 17 patients (18%). In the organic stage (Group 2), mild dizziness occurred in 10 patients (14%), moderate in 25 patients (35%), and severe in 37 patients (51%).

Overall, in Group 1 (functional stage), mild and moderate dizziness predominated (82%), while severe cases were less common (18%). In Group 2 (organic stage), severe dizziness was more frequent (51%), and mild dizziness was less common (14%). These findings demonstrate a statistically significant relationship between VAS stages and dizziness severity.

According to the study data, DHI scores ($M \pm m$) for female and male patients in Groups 1 and 2 are presented in the following table.

1- table

Occurrence rates of dizziness on the DHI scale

DHI ball	1- group (n=99)		2- group (n=72)	
	Wome n (n=58)	Men (n=41)	Wome n (n=46)	Men (n=26)
0-30 (light)	20,5 $\pm$ 2 ,1	22,0 $\pm$ 1 ,9	18,0 $\pm$ 1 ,8	19,5 $\pm$ 2 ,0
31-60 (AVG.	45,0 $\pm$ 3 ,5	47,5 $\pm$ 3 ,2	50,0 $\pm$ 4 ,0	52,0 $\pm$ 3 ,8
61-100 (strong)	70,0 $\pm$ 5	78,5 $\pm$ 4	78,0 $\pm$ 5	87,0 $\pm$ 5

	,0	,5	,2	,0
Note	<i>In Group 1 and 2, depending on the iSox stages, males have higher dizziness scores compared to females, and the differences are statistically significant ($p < 0.05$)</i>			

In Group 1 patients, gender differences in mild and moderate DHI categories were not significant (χ^2 , $p \geq 0.05$). However, for severe dizziness, men showed slightly higher mean scores compared to women (78.5 ± 4.5 vs 70.0 ± 5.0). In Group 2 (organic stage), DHI scores were elevated in all categories for both women and men due to the presence of organic changes. In the severe dizziness category, men scored 87.0 ± 5.0 , which was 9 points higher than women, a difference that was statistically significant (χ^2 , $p < 0.05$).

The average duration of pain syndrome in the study groups was 5.6 ± 3.4 years. Reflex syndromes were noted in all patients with cervical pain; cervicgia was observed in 119 patients (69.6%) and cervicobrachialgia in 70 patients (31%). Subjective assessment of neck pain using the Numerical Rating Scale (NRS) yielded a mean score of 7.2 (6.9–8.0), corresponding to severe pain. No statistically significant differences were observed between men and women in NRS scores ($p = 0.284$). Patients mainly reported pain associated with psycho-emotional stress and vasospasm.

In Group 2, pain intensity was significantly higher compared to Group 1, which was associated with organic lesions and microcirculation disturbances. Gender differences indicated slightly higher pain levels in women compared to men (Table 2).

2- Table

NRS (Numerical Rating Scale) scores in patients with vertebral artery syndrome by study groups (points, $M \pm m$)

Groups	Women	Men
1-group (n=99)	$4,8 \pm 0,7$	$3,9 \pm 0,3$
2-group (n=72)	$7,5 \pm 0,9$	$6,1 \pm 0,5$
Note	**$p < 0,01$ – statistically significant difference with respect to Group 1	

Thus, the study found that women had pain syndrome 23.1% higher in Group 1 and 22.9% higher in Group 2 compared to men. The difference in Group 1 (functional stage) is not statistically significant ($p = 0.284$), but in Group 2 (organic stage) the difference was significant and statistically significant compared to Group 1 ($p < 0.01$). These results show the importance of individualizing rehabilitation measures taking into account gender differences.

The cervical invalidity index for patients with vertebral artery syndrome (UAS) – Ndi (Neck Disability Index) scale results-showed mainly mild to moderate cervical invalidity index (NDI) indicators in the functional phase (Group 1) of vertebral artery syndrome (UAS). Specifically, 6.9% of cases in women showed no invalidity in the neck Sox, 34.5% were mild, 39.7% were moderate, 17.2% were severe, and only 1.7% showed very severe levels

of invalidity in the neck Sox. In men, however, these indicators are respectively 9,8%; 36,6%; 36,6%; 14,6% and 2.4%. From this, ctshrinib found that in male and female patients in Group 1, neck invalidity was often reported to occur at mild to moderate levels, while severe and very severe cases showed with relatively little observation (3- table).

3- table

Neck invalidity indicators (%) on the NDI scale

groups		0-4 (no)	5-14 (light)	15-24 (average)	25-34 (heavy)	≥35 (very heavy)
1- group (n=99)	Wo men	6,9	34,5	39,7	17,2	1,7
	Men	9,8	36,6	36,6	14,6	2,4
2- group (n=72)	Wo men	2,2	13,0	32,6	39,1	13,0
	Men	0	11,5	34,6	38,5	15,4
<i>Note</i>		<i>* p<0,01– statistically significant difference with respect to Group 1</i>				

The analysis showed that in Group 1 (functional stage), the Neck Disability Index (NDI) scores were predominantly mild to moderate, with severe and very severe cases being infrequent. In contrast, in Group 2 (organic stage), both female and male patients exhibited significantly higher rates of severe and very severe neck disability, with the difference reaching statistical significance ($p<0.01$). The increased neck disability in the organic stage of vertebral artery syndrome (VAS) reflects a worsening of the clinical-neurological course and highlights the necessity of earlier implementation of rehabilitation and therapeutic interventions during the transition from the functional to the organic stage.

Specifically, in Group 1, NDI scores were lower compared to Group 2. Among females, the mean NDI was 19.4 ± 6.2 points, while in males it was 17.1 ± 5.9 points, indicating that neck disability was mostly mild to moderate. In Group 2, NDI scores were considerably higher, with females averaging 27.6 ± 7.5 points and males 26.8 ± 7.2 points. For both sexes, the NDI scores in Group 2 were significantly higher than in Group 1 ($p<0.01$), (4- table).

4- table

NDI шкаласи бўйича бўйин инвалидлик кўрсаткичлари (балл, $M \pm m$)

groups	Women	Men
1- group (n=99)	$19,4 \pm 6,2$	$17,1 \pm 5,9$

2- group (n=72)	27,6±7,5*	23,8±7,2*
Note	<i>p<0,01– statistically significant difference with respect to Group 1</i>	

During the transition from the functional to the organic stage of vertebral artery syndrome (VAS), neck disability showed a consistent increasing trend, underscoring the importance of the Neck Disability Index (NDI) in clinical-diagnostic assessment and the necessity of early rehabilitation interventions.

Using the PAQ scale, gender role components (masculine, feminine, and androgynous) were evaluated in patients with VAS at the functional stage (Group 1, n=99) and organic stage (Group 2, n=72). In the functional stage, females (n=58) had mean scores of 20.1 ± 0.9 for the masculine component, 22.2 ± 1.0 for the feminine component, and 1.0 ± 0.1 for the androgynous component. Males (n=41) scored 22.5 ± 1.1 , 17.3 ± 0.9 , and 0.8 ± 0.1 , respectively. In the organic stage, females (n=46) scored 19.5 ± 0.8 (masculine), 21.2 ± 0.9 (feminine), and 1.0 ± 0.1 (androgynous), whereas males (n=26) scored 22.0 ± 1.0 , 16.2 ± 0.8 , and 0.7 ± 0.1 , respectively. Overall PAQ scores ranged from 32–50 in Group 1 and 31–47 in Group 2. Statistical analysis of PAQ scores revealed that gender differences in the masculine and feminine components were significant in both functional and organic stages ($p<0.05$), while the androgynous component showed moderate differences. These findings confirm that gender role and psycho-psychological adaptation mechanisms differ between functional and organic stages in patients with VAS (5- table).

5- table

Gender distribution of patients in the functional and organic phase on the PAQ scale (M±M)

groups			M)	F	A	M in– Max
1- group (n=99)	w omen	8	20,1 ±0,9	22,2 ±1,0	1,0 ±0,1	3 5–50
	m en	1	22,5 ±1,1	17,3 ±0,9	0,8 ±0,1	3 2–48
2- group (n=72)	w omen	6	19,5 ±0,8	21,2 ±0,9	1,0 ±0,1	3 3–47
	m en	6	22,0 ±1,0	16,2 ±0,8	0,7 ±0,1	3 1–45
Note	<i>the difference between women and men in masculin and feminin components is statistically significant ($p<0.05$), while the difference in adrogin components is not significant.</i>					the difference between women and men in

		masculin and feminin components is statistically significant ($p<0.05$), while the difference in adrogin components is not significant.
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In patients with VA (vertebral artery) syndrome at the functional and organic stages, males scored 1.12 times higher than females on the masculine component of the PAQ scale, while females scored 1.31 times higher than males on the feminine component, with the differences being statistically significant ($p<0.05$).

Autonomic dysfunction was observed in nearly all patients. Analysis of autonomic system indicators using the COMPASS-31 (Composite Autonomic Symptom Score – 31) scale revealed significant differences between the functional stage (Group 1) and organic stage (Group 2) patients.

Autonomic dysfunction in VA syndrome patients was assessed via the COMPASS-31 scale, and patients were categorized according to PAQ gender role as Masculine (M), Feminine (F), and Androgynous (A). In the functional stage (Group 1), the Feminine (F) group had a total COMPASS-31 score of 31.5 ± 1.1 , sympathetic component 17.5 ± 0.9 , and parasympathetic component 14.0 ± 0.7 . The Masculine (M) group showed a total score of 27.5 ± 1.3 , sympathetic 14.2 ± 0.8 , and parasympathetic 13.3 ± 0.7 . The Androgynous (A) group had intermediate scores, with a total of 29.5 ± 1.3 , sympathetic 16.0 ± 0.9 , and parasympathetic 13.5 ± 0.7 .

In the organic stage (Group 2), the Feminine (F) group had a total score of 32.5 ± 1.0 , sympathetic 18.0 ± 0.8 , and parasympathetic 14.5 ± 0.7 . The Masculine (M) group had total 28.0 ± 1.4 , sympathetic 14.5 ± 0.9 , and parasympathetic 13.5 ± 0.8 . The Androgynous (A) group scored total 30.0 ± 1.4 , sympathetic 16.5 ± 0.8 , and parasympathetic 13.5 ± 0.7 .

Thus, the total scores on the COMPASS scale of 31 in the field of functionality and organics in patients with feminist gender role masculinism on the PAQ scale were 1.16 points, in the sympathetic component in patients with feminist gender role masculinism-31 points, for the parasympathetic component with a mass of 1.24 barrels, for the parasympathetic component with a mass of 1.07 barrels, the statistical significance ($p<0.05$) is equal to.

Depending on the gender and psychophysiological characteristics of patients with bipolar disorder, cognitive, psychoemotional and vegetative bipolar bipolarity, erectile bipolarity and individualized bipolar bipolarity are distinguished, which affects the functionality and psychophysiology of patients. In order to become a better person, you need to be confident in yourself.

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