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The relation between chronic neck pain and hypertension (Ashatra city study)

Keyword: chronic neck pain, cervical spondylosis, risk factors, hypertension

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Background

An idea raised in our field of work a few years ago claim that chronic neck pain and cervical spondylosis were a causative factors of hypertension, and as hypertension and cervical spondylosis are common in middle age and old people it may be a true story or it just a coincidence.

Hypertension

Hypertension by itself is one of a common disease for increase the mortality in associated to cardiovascular diseases in both developing and developed countries.[1] So It's important to get attention about the hypertension causes and risks factors, and focusing on a disorder as it can be caused by multiple environmental and inherited risks factors.[2,3] The prevalence of high blood pressure in adult are ranged from 30 -45%, in 2015.[4] This high rate is across the world, and are irrespective to income status, so it can be found in the low, mid, and high income countries. Hypertension more common with aging, as prevalence of more than 60% in people how aged more than 60 years because that the populations age, become more sedentary lifestyles, and increase their body weight, so the prevalence of hypertension will continue to be rise.[5]

Risk factors for raised blood pressure

a) High salt intake (adding salt on cooked meal more risky than during cocking).

b) Low potassium intake (low fruit and vegetable consumption).

c) Increase body weight (sedentary lifestyle, rise the incidence of joint osteoarthritis).

d) No or lack of physical exercise.

e) Excess consumption of alcohol.[6,7]

Cervical spondylosis

Cervical Spondylosis and chronic neck pain one of a common disorders of the spine, caused by the degeneration of cervical intervertebral discs and facet joints. These structures support and transmit the forces between vertebrae, With time degeneration process progress and the bony spur (osteophytic) will develop which may narrowing the spine canal diameter,[8] and so increase the pressure on the spinal cord lead to neurological and vascular changes. Spondylosis considered as age related degenerative changes in the spinal column structures, and radiographic findings of cervical spondylosis are frequently notice in asymptomatic adults.[9] Variable degree of disc degeneration found in people about 25% of people younger than 40 years of age, half of people over 40 years of age, and 85% of individuals over 60 years of age.[10] The radiculopathy and/or myelopathy may result in a significant disability.[11] Pain that arising from upper cervical region may be referred to the head, and the patient how unaware of had any cervical problem, the headache will be the presenting feature.[12]

Causes of chronic neck pain

i. Non specific neck pain: Most patients who present with neck pain have non-specific (simple), postural basis.

ii. Mechanical: disc prolapse or diffuse idiopathic skeletal hyperostosis.

iii. Inflammatory disease: rheumatoid arthritis, ankylosing spondylitis.

iv. Metabolic diseases: Paget's, osteoporosis, gout, or pseudo-gout.

v. Infections: bacterial osteomyelitis or tuberculosis.

vi. Malignancy: primary tumors, secondary deposits, or myeloma.[13]

The neck pain is either to be acute or chronic lasting more than 12 weeks and with or without an identifiable precipitating events,[14] may lead to incapacities and working productivity losses.[15] Hypertension (HT) and cervical spondylosis are common disorder being increasingly observed in the population.[4,5,16]

Pathophysiology

The perception of acute pain plays an important role in the preventing of tissue damage. The ascending of recruitment of segmental spinal reflexes through the physiological neuronal connections activated the sympathetic nervous system, which increases peripheral resistances, heart rate, and stroke volume. The response also involves the neuroendocrine system, and, in particular, the hypothalamic-pituitary-adrenal axis, in addition to further activation of the sympathetic system by adrenal glands. However, in proportion to an elevation in resting blood pressure, there is a contemporary and progressive reduction in sensitivity to acute pain, which could result in a tendency to restore arousal levels in the presence of painful stimuli. The pathophysiological pattern is significantly different in the setting of chronic pain, in which the adaptive relationship between blood pressure and pain sensitivity is substantially reversed.[17] In healthy individuals, elevated blood pressure is associated with

diminished acute pain sensitivity to acute pain. These cardiovascular/pain regulatory system interactions appear altered in patients with chronic pain; elevated blood pressure is associated with increased acute and chronic pain responsiveness. If these alterations reflect failure of overlapping systems modulating pain and blood pressure, it was expected that prevalence of clinical hypertension would be increased in the chronic pain population.[18,19]

Patients and methods

Hypertension and chronic neck pain are highly prevalent in adult populations. The objective of this study was to investigate the association between hypertension and chronic neck pain. We included all age groups, both sex, any income level, all education level, all occupation, body mass index (BMI), smoking status, alcohol consumption, and moderately exerting physical activity were included as general, socioeconomic, and lifestyle-related characteristics. We studied 3543 patients, 2588 of them were females and 955 males in ratio 2.7:1, in ASHATRA general hospital in the south of Iraq (ASHATRA study), from the first of January 2015 to the first of January 2019, the patients attended to the hospital and to the privet clinics with chronic neck pain (more than 12 weeks).

Clinical assessment of all patients was done for the diagnosis the cervical spondylosis causes of their pain by thorough clinical examinations and radiological examinations to exclude any predisposing factors and underlying causes, all of the patients that selected fall in the same categories of body weight, life style, race, no previous trauma or any underlying causes of neck pain like infection and tumor. Blood pressure was measured by trained doctors and nurses using a mercury sphygmomanometer with 25–35 cm cuff in a sitting position with arm supported at heart level after a 5 minute rest. Measurements were recorded to the closest 2 mmHg on the manometer, we exclude the patients with first degree relative that had HT and those with diabetes mellitus DM.

In 2015 from the first of Jan. To the 31 of Dec. there were 978 patients in total complain from chronic neck pain as 726 females and 252 males (Table 1). The total no. of patients with chronic neck pain in 2016 were 932 in total as 665 females and 267 males (Table 2). The total No. of patients had chronic neck pain in 2017 were 725 in total as 523 females and 202 males in 2.5:1 ratio (Table 3). The total No. of patients that suffer from chronic neck pain in 2018 were 908 and the female patients were 674 and males were234 in 2.8: 1 ratio (Table 4).

Table 1 Number of chronic neck pain of females and males patients in 2015

Months	<20 years		20-30 y		30-40 y		40-50 y		50-60 y		>60 y		Total	
	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.
Jan	3	0	13	2	19	4	21	5	7	3	5	4	68	18
Feb	2	0	7	6	15	6	17	3	10	3	10	1	61	19
Mar	2	0	16	7	14	9	15	6	16	4	5	1	68	27
Apr	2	1	13	3	17	8	13	8	12	4	4	2	61	26
May	1	0	16	4	15	9	15	6	6	5	8	0	61	24
Jun	1	1	14	4	11	4	14	5	10	5	10	0	60	19
Jul	2	0	7	2	11	4	8	5	6	3	3	4	37	18
Aug	1	1	15	4	15	6	11	2	15	5	9	3	66	21
Sep	2	2	16	6	17	4	19	7	10	2	11	10	75	31
Oct	5	1	13	1	18	7	10	10	9	4	5	1	60	24
Nov	3	0	16	2	20	5	16	4	6	3	7	0	68	14
Dec	3	2	11	1	10	3	2	3	8	1	7	1	41	11
Total	27	8	157	42	182	69	161	64	115	42	84	27	726	252

F, female; M, male

Table 2 The chronic neck pain of female and male patients in 2016

Months	<20 y		20-30 y		30-40 y		40-50 y		50-60 y		>60 y		Total	
	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.
Jan	5	2	13	4	17	6	24	2	10	7	11	5	80	26
Feb	2	2	15	3	14	2	16	3	8	3	10	4	65	17
Mar	1	2	7	5	15	9	18	7	14	3	9	2	64	28
Apr	1	0	12	1	17	6	12	5	10	4	8	7	60	23
May	3	0	6	4	5	5	7	4	7	2	6	2	34	17
Jun	2	1	15	4	19	5	13	3	6	1	7	3	62	17
Jul	0	0	3	7	7	8	13	8	8	3	9	2	40	28
Aug	2	0	15	5	10	11	11	5	5	3	6	2	49	26
Sep	3	0	8	1	12	10	15	9	11	4	11	2	60	26

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Table Continued....

Months	<20 y		20-30 y		30-40 y		40-50 y		50-60 y		>60 y		Total	
	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.
Oct	1	3	9	3	10	5	10	8	4	2	13	3	47	24
Nov	3	1	8	4	18	4	10	5	10	4	6	4	55	22
Dec	1	0	15	2	10	4	10	2	4	2	9	3	49	13
Total	24	11	126	43	154	75	159	61	97	38	105	39	665	267

Table 3 No. of females and male patients with chronic neck pain in 2017

Months	<20 y		20-30 y		30-40 y		40-50 y		50-60 y		>60 y		Total	
	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.
Jan	0	0	10	1	11	3	15	8	7	2	10	2	53	16
Feb	0	1	9	0	6	5	12	4	6	0	4	2	37	12
Mar	2	0	11	3	15	5	16	7	6	4	7	8	57	27
Apr	1	1	13	1	14	5	12	8	4	3	6	2	50	20
May	0	0	5	2	9	4	8	1	7	1	6	1	35	9
Jun	2	0	5	7	6	4	6	3	5	1	3	7	27	22
Jul	1	0	13	2	11	4	13	3	10	0	11	1	59	10
Aug	2	2	10	3	10	7	12	4	8	1	5	2	47	19
Sep	1	0	11	3	12	6	10	7	6	1	10	2	50	19
Oct	1	1	9	2	9	7	8	4	9	2	4	1	40	17
Nov	2	0	3	0	5	2	7	2	5	3	9	3	31	10
Dec	0	0	7	0	10	5	9	8	7	1	4	7	37	21
Total	12	5	106	24	118	57	128	59	80	19	79	38	523	202

Table 4 No. of females and males with chronic neck pain in 2018

Months	<20 y		20-30 y		30-40 y		40-50 y		50-60 y		>60 y		Total	
	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.
Jan	2	1	13	3	15	4	13	3	14	2	13	2	70	15
Feb	2	1	3	1	9	2	12	4	7	2	1	1	34	11
Mar	3	0	9	10	24	7	21	7	15	3	10	8	82	35
Apr	5	1	12	3	11	6	13	4	11	1	7	1	59	16
May	6	0	10	3	15	10	6	5	7	5	5	4	49	27
Jun	1	1	8	2	10	9	12	4	8	1	10	4	49	21
Jul	1	0	11	2	9	8	8	4	7	2	4	2	40	18
Aug	3	0	15	4	18	6	17	9	12	1	3	4	68	24
Sep	1	2	5	5	9	7	10	2	9	0	10	3	44	19
Oct	2	1	14	3	21	13	10	5	7	3	10	2	64	27
Nov	3	0	9	1	10	5	14	1	11	1	11	1	58	9
Dec	0	0	8	2	14	3	13	4	9	2	13	1	57	12
Total	29	7	117	39	165	80	149	52	117	23	97	33	674	234

In general all patients in the 4 years were 2.7:1 female/male ratio in range and all had chronic neck pain without any secondary underlying diseases, infection and trauma. In all age groups most of them both females and males commonly in 30-50 years of old in range which could be explained by increase the incidence of the daily activity works and breast feeding for females in this age group, our results fit with international ratio of age and sex distribution.

We found that the no. of females patients with chronic neck pain in the study were 2588 and 243 of them had HT in all age groups without underlying pathology in the 4 years (Table 5). While the total no. of males patient with chronic neck pain in our study in 4 years were 955 and those how had HT in all the age groups without any underlying pathology were 63 patients (Table 6).

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Table 5 No. of chronic neck pain female patients with HT

Year	2015		2016		2017		2018	
Month/no patients	Female	HT	Female	HT	Female	HT	Female	HT
Jan	68	5	80	3	53	11	70	7
Feb	61	6	65	3	37	4	34	8
Mar	68	5	64	4	57	11	82	16
Apr	61	4	60	5	50	6	59	9
May	61	8	34	2	35	5	49	3
Jun	60	0	62	5	27	4	49	2
Jul	37	5	40	4	59	9	40	0
Aug	66	2	49	3	47	5	68	3
Sep	75	5	60	4	50	7	44	8
Oct	60	7	47	4	40	4	64	3
Nov	68	1	55	6	31	7	58	3
Dec	41	1	49	6	37	0	57	10
Total	726	49	665	49	523	73	674	72

P=0.00000

Table 6 No. of male patients with chronic neck pain and had HT

Year	2015		2016		2017		2018	
Month/no patients	Male	HT	Male	HT	Male	HT	Male	HT
Jan	18	4	26	0	16	4	15	1
Feb	19	1	17	0	12	3	11	0
Mar	27	1	28	1	27	3	35	5
Apr	26	0	23	0	20	1	16	1
May	24	1	17	0	9	0	27	1
Jun	19	1	17	2	22	3	21	2
Jul	18	0	28	3	10	0	18	1
Aug	21	1	26	2	19	2	24	2
Sep	31	2	26	0	19	1	19	1
Oct	24	1	24	1	17	1	27	1
Nov	14	1	22	3	10	1	9	0
Dec	11	1	13	3	21	1	12	0
Total	252	14	267	15	202	20	234	14

P=0.00000

Conclusion

The published articles that deal with the relation between chronic neck pain and cervical spondylosis and HT are little and not focusing on can considered it is a risk factor of raising blood pressure or not. In healthy individuals, increase blood pressure is associated with diminished acute pain sensitivity. These cardiovascular/pain regulatory system altered in patients with chronic pain; and elevated blood pressure is associated with increased acute and chronic pain responsiveness. If these alterations reflect failure of overlapping systems modulating pain and blood pressure, it was expected that prevalence of clinical hypertension would be increased in the chronic pain population.[20]

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