European Journal of Molecular & Clinical Medicine

ISSN 2515-8260 Volume 07, Issue 10, 2020

Consequences of Chronic Rhinosinusitis on Blood Pressure

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Abstract
Chronic rhinosinusitis (CRS) is infection or inflammation of nasal airway and paranasal sinuses, the etiology of this disorder in multifactorial. CRS is directly related to threatened cardiovascular complications, Hypertension is one of the common chronic disorders that has great effect on the heart and blood vessels. In this prospective clinical study, we attempt to find the relationship between hypertension and CRS by investigated 2 groups of adult patients. The first group is composed of 100 patients of both sexes suffering from chronic rhinosinusitis compared to the second group (control) composed of 100 individuals who are healthy. The results refer that there is an important increase in the blood pressure in group 1 especially above 50 years compare to control group. This study found that CRS has important effect on blood pressure especially in men.

CRS: chronic rhinosinusitis, **BP**: Blood pressure

Introduction

Chronic rhinosinusitis or (CRS) is chronic infection of the paranasal sinuses or nasal passages that occurring for at least twelve weeks at a time (Metson, 2000). The prevalence of chronic rhinosinusitis in the European individuals is about 10.9%. Whereas other considered prevalence using physical examination and detailed questionnaire in USA was 14% (Heinrich, 2003).

The etiology of chronic rhinosinusitis is reported to be multifactorial disorder and can include infective, inflammatory, allergic, or mechanical factors for example, nasal polyposis and nasal septum deviation (Corbo, 2006) . Other less frequent causes are

muco-ciliary dysfunction, immune deficiency syndrome, and fungal infections (Kony, 2003). Frequently, patients with chronic rhinosinusitis presented with nasal obstruction, runny nose, rhinorrhea, pain and tenderness of the face and disorders of the smell (Dales, 2006).

Chronic rhinosinusitis is considered as a common chronic disorder and is related to various socioeconomic complications (Heinrich, Rhinitis and blood pressure in adults, 2003). Several studies reported that CRS may lead to lethal intracranial complications, for example meningitis, subdural and brain abscess, and cavernous sinus thrombosis (CST) (Dales, 2006), (Kony, 2003).

Hypertensions is one of the chronic worldwide diseases (Aung, 2010). It is considered as a major risk factor for many life-threatening disorders, such as, myocardial infarction, cerebral vascular accident or stroke, vascular diseases, and chronic renal disorders (Lee, 2018). Regardless of extensive research over the previous several decades, the etiology and pathophysiology of most cases of adult hypertension are still unidentified (Oparil, 2003). The measurement of blood pressure is still suboptimal in the common population (Dales, 2006). It is defined when a systolic blood pressure is 140 mm Hg or higher or a diastolic blood pressure is 90 mm Hg or higher or antihypertensive medication has been taken, or having been informed by clinicians on minimum two times as having hypertension (Kony, 2003) (Oparil, 2003).

Current epidemiological study stated that rates of high blood pressure and systolic blood pressure were considerably increase in individuals with rhinitis compared to without rhinitis (Magen, 2006). Furthermore, It has been reported that rhinitis may be linked to cardiovascular risk factor, as rhinitis may be related to smoking, sleep apnea, and snoring, which finally lead to increase in the blood pressure (Peppard, 2000).

Materials and Methods

A prospective observational clinical study was conducted from November 2018 to March 2019 in otolaryngology department in Baqubah teaching hospital in Diyala governorate.

Group 1 : 100 adult patients of both sexes aged between 18–60 years, suffering from symptomatic chronic sinusitis, referred from otolaryngology department, (67) were male and (33) were female. Detailed history has been taken from them and blood pressure has been measured using sphygmomanometer. Group 2: involve 100 indivduals (61 male and 39 female) considered as a control group of both sexes aged between 18–60 years has been also included in this study who not complaining of any signs and symptoms of chronic sinusitis.

Blood pressure was taken in a well-relaxed patient, in supine situation, usually in right upper limb, with a usual mercury sphygmomanometer, on 3 separate times; with at least o 10 min between readings. The average of these 3 readings was then calculated. High blood pressure or hypertension was defined when systolic blood pressure is 140 mm Hg or above and diastolic blood pressure is 90 mm Hg or above.

Statistical analysis

The X2 (Chi-squared) test method used to test theories on the differences between the percentages. a level of significance of α=0.05 was applied to test, the statistics software used to process the data analysis were the (SPSS version 22

Results

The distribution of age of patients who suffering from chronic rhinosinusitis in this study was as following: 1% from 10 to 19 years, 34% from 20 to 29 years, 25% from 30 to 39 years, 24 % from 40 to 49 years, and finally 16% above 50 years (table 1).

While the age distribution of control group was : 2% from 10 to 19 years, 30% from 20 to 29 years,31% from 30 to 39 years, 23 % from 40 to 49 years, and finally 14% above 50 years (Table 1)

According to our results in this study, there is significant increase in blood pressure in patient group above 50 years (4%) compare to control group at the same age (2%). Furthermore we found that there is an increase the ratio of hypertension in patients group at age 20 to 29 (3%) compare to control (0%). We don't find any obvious increase in the blood pressure between control and patients group at the age between 10 to 19 years (table 1 and Figure 1).

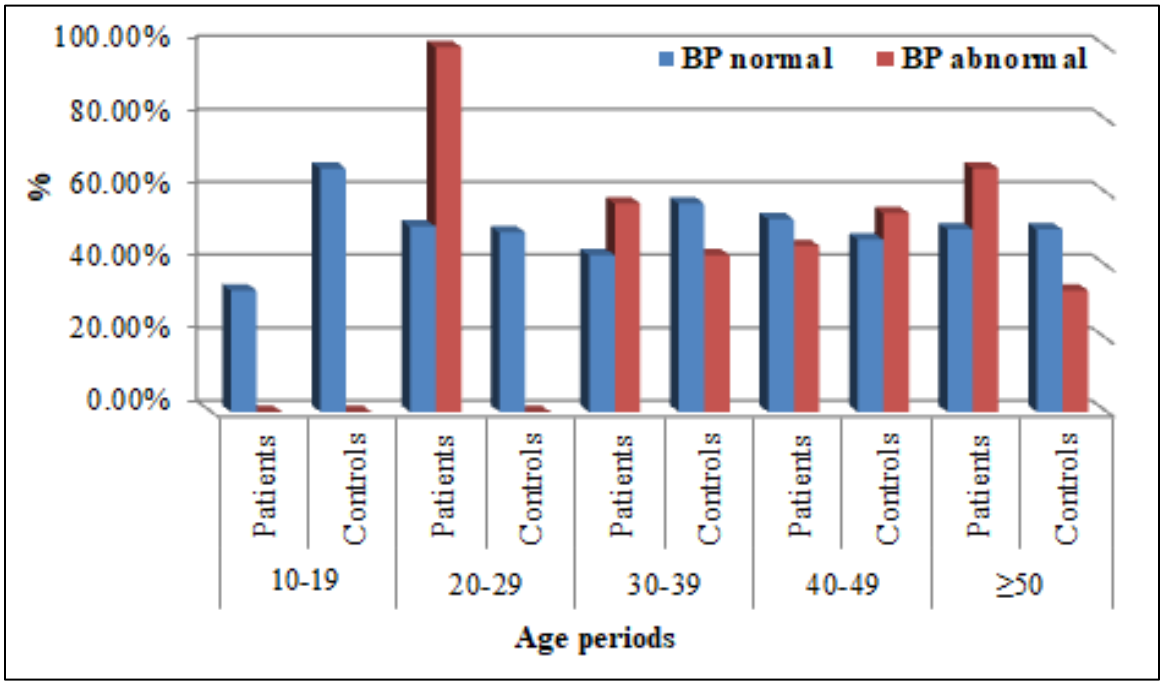
The male ratio in patients group was 68% while the female was 32 % . In control group the male percentage was 61% while the female 39%. We found important increase in the blood pressure in male who complain of chronic rhinosinusitis (12%), compare to female patients (4%) (table 2).

Considerately, we found that 24 patients (24%) who has chronic rhinosinusitis is a known case of hypertension. 16 patients of them have been examined with has high blood pressure and 8 patients were normotensive at the time of examination. While in control group 14 patients (14 %) have hypertension. 4 were normotensive and 10 were hypertensive at the time of examination. (table 3)

age				BP		Total
				Normal BP	High BP	
10-19	Groups	patients	N	1	0	1
			%	33.3%	0	33.3%
		controls	N	2	0	2
			%	66.7%	0	66.7%
20-29	Groups	patients	N	31	3	34
			%	50.8%	100.0%	53.1%

		controls	N	30	0	30
			%	49.2%	0.0%	46.9%
30-39	Groups	patients	N	21	4	25
			%	42.9%	57.1%	44.6%
		controls	N	28	3	31
			%	57.1%	42.9%	55.4%
40-49	Groups	patients	N	19	5	24
			%	52.8%	45.5%	51.1%
		controls	N	17	6	23
			%	47.2%	54.5%	48.9%
≥50	Groups	patients	N	12	4	16
			%	50.0%	66.7%	53.3%
		controls	N	12	2	14
			%	50.0%	33.3%	46.7%

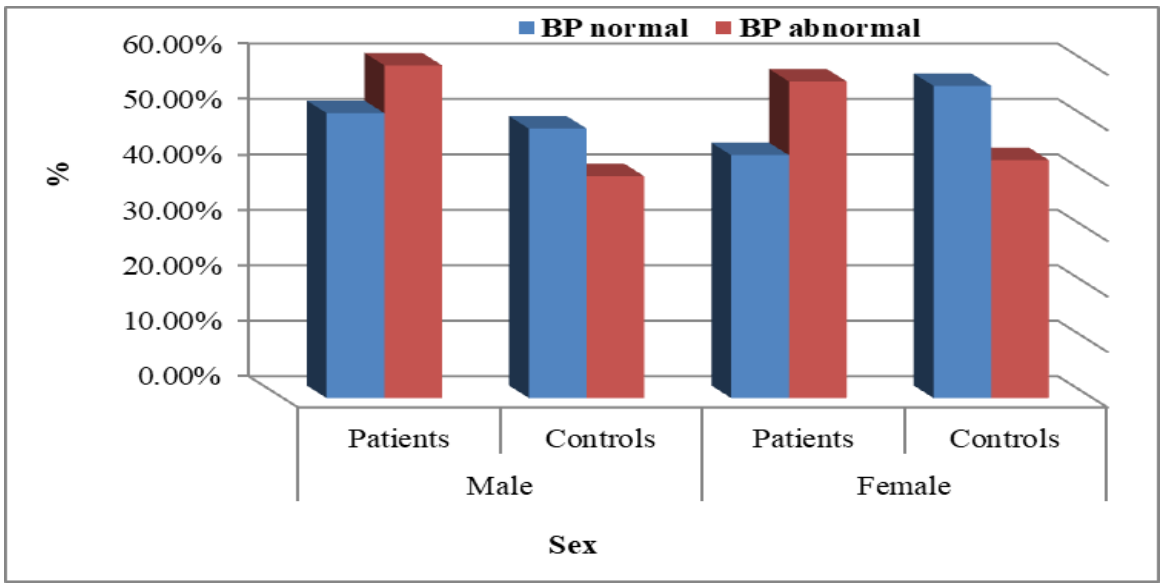
(Table 1) shows the age distribution and blood pressure in both control and patient groups.



(Figure 1) shows the distribution of age and percentage of high blood pressure in both control and patient groups.

sex				BP		Total	P value
				Normal BP	High BP		
male	Groups	patients	N	56	12	68	0.32
			%	51.4%	60.0%	52.7%	
		controls	N	53	8	61	
			%	48.6%	40.0%	47.3%	
female	Groups	patients	N	28	4	32	0.38
			%	43.8%	57.1%	45.1%	
		controls	N	36	3	39	
			%	56.3%	42.9%	54.9%	
P value		0.26					

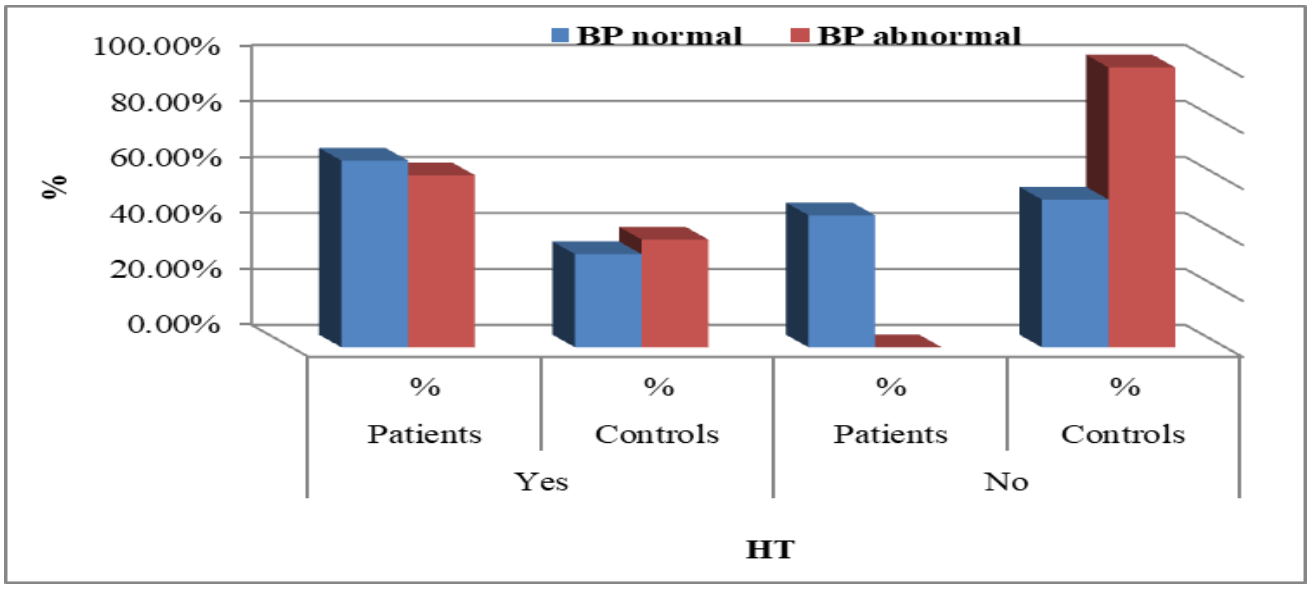
(Table 2) shows the relationship between sex and blood pressure in both control and rhinosinusitis group.



(Figure 2) shows the association between male and female and hypertension in both control and patient group.

HT				Blood pressure		Total	P value
				normal	High		
Yes	Groups	patients	N	8	16	24	0.52
			%	66.7%	61.5%	63.2%	
		controls	N	4	10	14	
			%	33.3%	38.5%	36.8%	
No	Groups	patients	N	76	0	76	0.53
			%	47.2%	0.0%	46.9%	
		controls	N	85	1	86	
			%	52.8%	100.0%	53.1%	
P value		0.24					

(Table 3) shows the patients who are known cases of hypertension in both control and rhinosinusitis group .



(Figure 3) shows the association between HT, BP and groups.

ISSN 2515-8260 Volume 07, Issue 10, 2020

Discussion

Rhinosinusitis is common problem in the publics and the hypertension is considered as one of the most common disorder in the world (Metson, 2000). In this literature, the consequence of chronic rhinosinusitis has been studied. Frequent epidemiological researches have suggested that lower respiratory impairment has direct effect on the cardiovascular disorders such as atherosclerosis, myocardial infarction and cardiovascular disorders (Lee, 2018) (Magen, 2006). Nevertheless the basic pathophysiological mechanisms of this association is persist unknown (Parish, 2004). In other hand no studies have investigated the correlation between upper respiratory infection or CRS and cardiovascular disorders (Magen, 2006). While other epidemiological studies have been reported a strong association between cardiovascular diseases and lower respiratory tract disorders (Dales, 2006) (Kony, 2003). The main objective of the present study is to assess if chronic rhinosinusitis is correlated with hypertension.

Therefore, we measure the blood pressure for 100 patient with rhinosinusitis and 100 person from normal people without rhinosinusitis and for the importance of these diseases we will find the relationship between them.

According to our results in this study, there is significant increase in blood pressure in patient group above 50 years (4%) compare to control group at the same age (2%). Furthermore we found that there is an increase the ratio of hypertension in patients group at age 20 to 29 (3%) compare to control (0%). However, the most common cause for hypertension is idiopathic so there is no significant cause for this increase in the ratio.

Furthermore, we found an important increase in the blood pressure in male who complain of chronic rhinosinusitis (12%), compare to female patients (4%) , this may be due to the body built or hormonal effect , our result differ from another result in another research, that say males with sinusitis were just over 2% more likely to have hypertension (9.3% vs. 7.1%) whereas the difference was 4% for women . These results concomitant with other recent studies who reported that rhinitis and nasal obstruction is high in male than female (Dales, 2006). However, other results have been stated by Young and Peppard in which the differences between male and female with or with rhinitis is not considerable (Peppard, 2000).

In general there are 16 individuals have elevated blood pressure in patient group and 10 individuals in control group so the difference was 4%. Furthermore, 24 patient had chronic hypertension in patient group and 16 individuals in control group. Therefore, in this study, we found a relationship between chronic rhinosinusitis and hypertension.

ISSN 2515-8260 Volume 07, Issue 10, 2020

Conclusion

Our data adds further information on the correlation between chronic rhinosinusitis and hypertension. Patients with CRS should be checked out regularly for high blood pressure. Moreover, Women with CRS should be further investigated for hypertension.

References

1. Metson, R. B., & Gliklich, R. E. (2000). Clinical outcomes in patients with chronic sinusitis. *The Laryngoscope*, *110*(S94), 24-28.
2. Heinrich, J., Topp, R., & Brasche, S. (2003). Rhinitis and blood pressure in adults. *American journal of respiratory and critical care medicine*, *168*(10), 1243-1245.
3. Oparil, S., Zaman, M. A., & Calhoun, D. A. (2003). Pathogenesis of hypertension. *Annals of internal medicine*, *139*(9), 761-776.
4. Corbo, G. M., Forastiere, F., Agabiti, N., Baldacci, S., Farchi, S., Pistelli, R., ... & Viegi, G. (2006). Rhinitis and snoring as risk factors for hypertension in post-menopausal women. *Respiratory medicine*, *100*(8), 1368-1373.
5. Kony, S., Zureik, M., Neukirch, C., Leynaert, B., Vervloet, D., & Neukirch, F. (2003). Rhinitis is associated with increased systolic blood pressure in men: a population-based study. *American journal of respiratory and critical care medicine*, *167*(4), 538-543.
6. Dales, R., Chen, Y., & Lin, M. (2006). Chronic sinusitis and arterial hypertension in a national population health survey. *International journal of cardiology*, *107*(2), 230-234.
7. Aung, T., Bisognano, J. D., & Morgan, M. A. (2010). Allergic respiratory disease as a potential co-morbidity for hypertension. *Cardiology journal*, *17*(5), 443-447.
8. Lee, W. H., Kim, J. W., Lim, J. S., Kong, I. G., & Choi, H. G. (2018). Chronic rhinosinusitis increases the risk of hemorrhagic and ischemic stroke: a longitudinal follow-up study using a national sample cohort. *Plos one*, *13*(3), e0193886.
9. Aung, T., Bisognano, J. D., & Morgan, M. A. (2010). Allergic respiratory disease as a potential co-morbidity for hypertension. *Cardiology journal*, *17*(5), 443-447.
10. Peppard, P. E., Young, T., Palta, M., & Skatrud, J. (2000). Prospective study of the association between sleep-disordered breathing and hypertension. *New England Journal of Medicine*, *342*(19), 1378-1384.
11. Young, T., Peppard, P., Palta, M., Hla, K. M., Finn, L., Morgan, B., & Skatrud, J. (1997). Population-based study of sleep-disordered breathing as a risk factor for hypertension. *Archives of internal medicine*, *157*(15), 1746-1752.
12. Magen, E., Yosefy, C., Viskoper, R. J., & Mishal, J. (2006). Treatment of allergic rhinitis can improve blood pressure control. *Journal of human hypertension*, *20*(11), 888-893.

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13. Rivera, S. L., Martin, J., & Landry, J. (2019). Acute and chronic hypertension: What clinicians need to know for diagnosis and management. *Critical Care Nursing Clinics*, *31*(1), 97-108.
14. Bayrak, P., Kirmaz, C., Sekuri, C., & Yuksel, H. (2007). Is pulmonary arterial pressure affected by allergic rhinitis with nasal obstruction?. *Asian Pacific journal of allergy and immunology*, *25*(2-3), 121.
15. Parish, J. M., & Somers, V. K. (2004, August). Obstructive sleep apnea and cardiovascular disease. In *Mayo Clinic Proceedings* (Vol. 79, No. 8, pp. 1036-1046). Elsevier.