

Intracranial Otogenic Complications in Adults: New Factors Influencing its Onset

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ABSTRACT

Objective: To identify new factors influencing the onset of intracranial otogenic complications in adults.

Study Design: Retrospective cohort

Place and Duration of Study: Department of ENT, Nowshera Medical College, Qazi Medical Complex Nowshera from 1st October 2019 to 31st October 2020.

Methodology: One thousand and nine hundred cases within the age of 40-78 years were enrolled. The data before viral pandemic of corona virus was compared with the data gained during pandemic. The intracranial complications included meningitis, abscess of subdural/epidural or brain, sigmoid sinus and or internal jugular vein-thrombosis. The period since registration till surgery varied from 6-24 hours with an average 10-14 hours. The confirmation of coronavirus in every patient was done before admission by using reverse transcription polymerase-chain reaction through nasopharyngeal swab.

Results: The mean age of 50.3±11.2 years. It was observed that there were cases of intracranial complication as 4 in pre covid time while ten were reported in the covid pandemic times. The Venous-sinus thrombosis was present in 60% of cases during covid pandemic while only in 25% before covid duration presenting a significant raise during pandemic time. Cardiovascular comorbidity was also presented significantly higher as 50% respectively in covid pandemic time with highest probability. Brain abscess and coagulopathies were also found significantly higher in covid pandemic times than in the duration before the covid, an Odd Ratio of 0.04(0.003; 1.05) 95% CI.

Conclusion: The new factors for influencing onset of intracranial otogenic complications in adult venous sinus thrombosis, brain abscess, coagulopathies and comorbidities as cardiovascular diseases.

Keywords: Otogenic complications, Intracranial, Thrombosis

INTRODUCTION

Otitis is a rare presentation with unusual occurrence which is associated with the common viral symptoms or else wise with isolated dysfunctions.¹ Within the recent years new viral variants have been observed in the environment resulting into catastrophic health damage. Coronavirus being on the top of the list. The inner ear impact of coronavirus 2019 variant has been well studied.²⁻⁴ Cochlea can be involved without any prominent symptoms or it could be involved sporadic with labyrinth like presentation.⁵ Otitis media as well as conductive loss of hearing is only presented in rare cases [6] while acute or chronic otitis is found to be presented randomly in any community.

There are factors which influences complications of the otogenic incidence. These factors involve higher morbidity ratio in a population. Nature of viral infection can also be a major influencing factor as many viral diseases such as coronavirus causes thromboembolism through rupturing of endothelium.⁷⁻⁹ In the coronavirus infected years cerebral venous-sinus thrombosis has been recognized¹⁰⁻¹³ with involvement of transverse and the sigmoid sinuses as common sites while multiple sites were also observed.¹⁴

The exact percentage of the complications related with ear infections could vary due to variant medical facilities during a viral pandemic. The present study was designed for identifying new factors which influences complications related with intracranial otogeny. The results of this study will assist in better health related outcomes of intracranial otogenic patients.

MATERIALS AND METHODS

In this cohort study, all the cases visiting the hospital for otological conditions were enrolled. The study was conducted at Department of ENT, Nowshera Medical College, Qazi Medical Complex Nowshera from 1st October 2019 to 31st October 2020. The consent of each patient was taken prior enrolment. This study design was retrospective where data before viral pandemic of coronavirus was compared with the data gained during pandemic. The oto surgeries which were planned as tympanoplasty, stapes, cochlear-implants or osseous implants were performed in patients requiring surgery. Otogenic complications was termed as subacute, chronic-otitis media having discharge from ear,

headache, fever, otalgia, and well-known diagnosis of intra-temporal or intracranial complications. The intracranial complications included meningitis, abscess of subdural/epidural or brain, sigmoid sinus and or internal jugular vein-thrombosis. The period since registration till surgery varied from 6-24 hours with an average 10-14 hours. The confirmation of coronavirus in every patient was done before admission by using reverse transcription polymerase-chain reaction through nasopharyngeal swab. Patient's details including age, gender, otological history, complaint character as well as duration, comorbidities, neurological-status, pharmacological-prophylaxis, immobility status and risk of coagulopathy were entered. Data was analyzed by using SPSS version 25. Odds Ratio was used for analysis keeping CI as 95%.

RESULTS

The mean was age 50.3±11.2 years and it was observed that there were cases of intracranial complication as 4 in pre covid time while ten were reported in the covid pandemic times. A total of 1000 ENT surgical procedures in pre covid and 900 in covid times were recorded however ear conditioned surgeries which were planned were only 209 and 266 respectively within the later and former duration (Table 1).

Table 1: ENT cases reported within pre covid and pandemic time

Parameter	Duration		Total
	Pre-Covid Pandemic	Covid Pandemic	
Intracranial Complications	4	10	14
Sigmoid-sinus thrombosis	1	6	7
ENT Surgical procedures	1000	900	1900
• Planned otosurgeries	209	266	275
• Urgent otosurgeries	7	9	16
ENT emergency consultations	850	812	862

Out of the total intracranial otogenic complications hundred percent cases were males in pre covid duration while 80% were males and 20% were females with and Odd Ratio as 0.55 with 95% CI. The Venous-sinus thrombosis was present in 60% of cases during covid pandemic while only in 25% before covid duration presenting a significant raise during pandemic time. Cardiovascular comorbidity was also presented significantly higher

as 50% respectively in covid pandemic time with highest probability (Table 2).

Brain Abscess and coagulopathies were also found significantly higher in covid pandemic times than in the duration

before the covid with an Odd Ratio of 0.04(0.003; 1.05) 95% CI (Table 3).

Table 2: Comparison of gender, Venous-sinus thrombosis and comorbidities before and at covid pandemic

Variable	Duration		95% CI	Probability
	Pre-Covid Pandemic	Covid Pandemic		
Gender				
Male	4 (100%)	8 (80%)	0.55 (0.01;15.2)	p = 1.02
Female	-	2 (20%)		
Venous-sinus thrombosis				
Absent	3 (75%)	4 (40%)	6 (0.37;64.5)	p = 0.3
Present	1 (25%)	6 (60%)		
Comorbidities				
Other	1 (25%)	-	N/A	P = 0.001
Cardiovascular	1 (25%)	4 (50%)		
Pulmonary	1 (25%)	1 (10%)		
None	1 (25%)	1 (10%)		

Table 3: Comparison of Intracranial complications before and at covid pandemic

Variable	Duration		95% CI	Probability
	Pre-Covid Pandemic	Covid Pandemic		
Intracranial complications				
Meningitis	2 (50%)	1 (10%)	N/A	p = 0.008
Brain abscess	1 (25%)	4 (40%)		
Venous sinus thrombosis	-	2 (20%)		
Brain abscess or meningitis with sinus thrombosis	1 (25%)	3 (30%)		
Risk factors for coagulopathies				
Yes	1 (25%)	8 (80%)	0.04 (0.003; 1.05)	p = 0.066
No	3 (75%)	1 (20%)		

DISCUSSION

This study was based on comparing the previously known factors for influencing intracranial otogenic complications with recently reported factors. The comparison was made in reference with the services provided during a retrospective analysis of medical record. Intracranial otogenic complications still occur despite antibiotic advancement in many cases.^{15,16} However, these complications are found to be extremely rare.

Cholesteatoma being most common cause of otogenic sigmoid-Othrombosis has been reported widely in various literatures. It is considered as a infrequent complication of otitis-media.¹⁶ Contradictorily this study presented results with high frequency of otitis media where majority of the patients with novel coronavirus acute otitis media converted into subacute and further resulted into lethal Cerebral venous-sinus thrombosis within a duration of not more than three to four weeks. The clinical presentation of this was accompanied with pain in the ears.

The treatment plan was however kept similar as observed in this present study as well for otitis media patients before and during the viral pandemic. The treatment included antibiotic courses. The pathogenic symptoms of sigmoid-sinus as well as mastoid pain vein-thrombosis were taken as clinical warning of otogenic complications. Patients who developed Cerebral venous sinus thrombosis were having mild to moderate severity of the novel coronavirus¹⁷ with hypercoagulable state being observed even in mild cases of novel coronavirus.

Patients who suffered from novel coronavirus and having otogenic complications also displayed factors like cardiovascular comorbidities¹⁸⁻²⁰ which were new onset influencers than previously reported.

CONCLUSION

The new factors for influencing onset of intracranial otogenic complications in adults Venous sinus thrombosis, brain abscess, coagulopathies and comorbidities as cardiovascular diseases.

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