



Cross-sectional Study

Impact of the COVID-19 pandemic on the volume of chronic suppurative otitis media surgeries



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ABSTRACT

Background: Chronic suppurative otitis media (CSOM) is a case of ear infection which prevalence is still relatively high, especially in developing countries. Surgery is the definitive management for CSOM that aims to eradicate the infection and improve the hearing conduction system. The COVID-19 pandemic has put enormous pressure on the global health care system, including limitations on elective surgical procedure at most hospital at the beginning of the pandemic.

Objective: This study aimed to assess the impact of the Covid-19 pandemic on the volume of chronic suppurative otitis media surgeries.

Methods: A retrospective study on 236 chronic suppurative otitis media patients. The number of surgeries collected from April to December 2019 and 2020 was compared. Statistical analysis used the t-independence and linear regression test with $p < 0.05$.

Results: The otologic surgeries decreased by 83.7% between 2019 and 2020. There were 203 surgeries (2019) vs 33 (2020). The average number of surgeries per month in 2019 and 2020 was 23 ± 6 patients and 4 ± 2 patients, respectively ($t = 2.365$; $p < 0.001$). All cases that underwent surgery in 2020 were cases with complications. Special consent and preparation must be completed before surgery.

Conclusion: The number of otitis media surgeries significantly decreases during the COVID-19 pandemic.

1. Introduction

Otitis media (OM) is an inflammation of the middle ear without reference to the etiology and pathogenesis [1]. Otitis media is one of the main reasons for high clinic visits, antibiotic consumption, and surgical treatment in the Department of Otolaryngology-Head and Neck Surgery [2]. The World Health Organization reports 709 million cases, with an average prevalence of 10.8% per 100,000 population, with around 68–78 million or 4–6% diagnosed with CSOM [2,3]. Management of CSOM is carried out by providing ear drops as first-line therapy and other drugs according to the patient's clinical condition. Surgery is performed to eradicate infections that do not respond well to medication and improve the hearing conduction system [4,5].

The Covid-19 pandemic has put enormous pressure on global healthcare systems. The coronavirus outbreak at the end of 2019, known as COVID-19, started in Wuhan, China, then spread and became a pandemic [6]. According to WHO, as of October 25, 2020, confirmed cases of COVID-19 worldwide totalled 42,512,186, with a death rate of

1,147,301 people [7,8]. COVID-19 has become a pandemic in Indonesia since the discovery of the first case on March 2, 2020, in Depok. The increase in daily cases has been higher since August 2020, which reached more than 2000 cases per day [9].

Hasan Sadikin Hospital Bandung, as one of the national referral centres in West Java, is responsible for providing health services for its population, which is more than a quarter of the Indonesian population. The increase in COVID-19 cases in Indonesia also impact on surgery services at Hasan Sadikin Hospital in Bandung due to restrictions on elective surgery and only performing emergency surgeries and surgeries with complications because health services are focused on COVID-19 patients and preventing transmission of COVID-19 infection to health workers. Surgery services, including surgery in CSOM cases, are aerosol measures which allow the transmission of COVID-19. Based on the description above, we are interested in analyzing the comparison of the volume of otitis media surgery services before and during the COVID-19 pandemic.

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Table 1
Characteristics of participants.

Variables	CSOM Surgery	
	2019 (%) n = 204	2020 (%) n = 33
Sex		
Male	90 (44)	18 (55)
Female	114 (56)	15 (45)
Age		
0–17 y.o.	33 (16)	4 (12)
18–45 y.o.	120 (59)	17 (52)
46–60 y.o.	44 (22)	9 (27)
>60 y.o.	6 (3)	2 (6)
BMI		
Underweight	44 (22)	4 (12)
Normal	118 (58)	19 (58)
Overweight	32 (16)	8 (24)
Obese	9 (4)	2 (6)
Complaint		
Otorrhea	186 (92)	31 (94)
Otalgia	17 (8)	14 (42)
Hearing loss	98 (48)	27 (82)
Balance disorders	1 (1)	4 (12)
Headache	4 (2)	11 (33)
Boils behind the ear	11 (5)	8 (24)
Loss of consciousness	1 (1)	1 (3)
Another complaint	130 (64)	15 (45)
Duration of Complaint		
Acute	25 (12)	1 (3)
Chronic	178 (88)	32 (97)
Ears		
Right	70 (34)	13 (39)
Left	81 (40)	16 (48)
Both	52 (26)	3 (9)
Examination of Ear Canal Diameter		
Normal	196 (96)	29 (86)
Stenosis	8 (4)	4 (14)
Granulation		
Yes	47 (23)	24 (73)
No	157 (77)	9 (27)
Tympanic Membrane Perforation		
Perforation <25%	11 (5)	0 (0)
Perforation 25–50%	53 (26)	4 (12)
Perforation >50%	93 (46)	15 (45)
Cannot be rated	19 (9)	3 (9)
Total perforation	25 (12)	6 (18)
Attic perforation	3 (1)	5 (16)
Cholesteatoma		
Yes	97 (47)	26 (79)
No	107 (53)	7 (21)
Complication		
Yes	35 (17)	33 (100)
No	169 (83)	0 (0)
Intratemporal Complications		
Subperiosteal abscess	1 (1)	0 (0)
Retroauricular fistula	11 (5)	7 (21)
Facial Nerve Paralysis	9 (4)	11 (36)
Labyrinthitis	1 (1)	0 (0)
Intracranial Complications	0 (0)	3 (9)
Mastoid Plain Image		
Diploic	6 (3)	2 (6)
Sclerotic	107 (53)	27 (82)
Mastoid can't be assessed	90 (44)	2 (6)
CT Scan Mastoid		
Temporal bone destruction	2 (1)	17 (52)
Mass or fluid in the middle ear	3 (1)	20 (61)
Ossicular destruction	1 (1)	3 (9)
Cochlear abnormalities	1 (1)	0 (0)
Mucosa in Mastoid Cavity		
Normal	101 (50)	4 (12)
Thicken	101 (50)	29 (88)
Audiogram		
Normal	18 (9)	0 (0)
Conductive hearing loss	144 (71)	19 (58)
Mixed hearing loss	22 (11)	9 (27)
Sensorineural hearing loss	19 (9)	5 (15)

2. Method

2.1. Study design

This study used a retrospective design with purposive sampling. The data collected consists of data on CSOM surgeries carried out during large-scale social restrictions in April–December 2020 and data before the COVID-19 pandemic in April–December 2019. Ethical approval was obtained from the Ethics Committee of Dr. Hasan Sadikin General Hospital, Bandung, Indonesia. The subjects in this study were grouped into 2, namely, Group 1 = a group of CSOM patients who underwent surgery from April to December 2019 and Group 2 = a group of CSOM patients who underwent surgery from April to December 2020. We report our study based on STROCSS 2021 guideline [10].

2.2. Data collection

Data collection was carried out from February to May 2021, including data on patient characteristics and the number of CSOM surgeries. All CSOM patient medical records were included as research subjects. The diagnosis of chronic otitis media is based on the criteria for intermittent or persistent discharge from the middle ear for more than 6 weeks with perforation of the tympanic membrane [1,11]. Cholesteatoma findings were assessed at the time of surgery. Complications of facial nerve paralysis caused by CSOM were evaluated using the House-Brackmann score [12].

2.3. Statistical analysis

The statistical test used in this study was linear regression test and independent *t*-test that were declared significant if $p < 0.05$. Data were analyzed using IBM SPSS Statistics software Version 23.0 (IBM Corp., Armonk, NY, USA).

3. Results

3.1. Characteristics of participants

The number of CSOM patients who underwent surgery in April to December 2019 (Group 1) was 204 patients and 33 patients in 2020 (Group 2). Most patients in Group 1 and Group 2 were female (56%) and male (55%). The most age range of patients in both groups was 18–45. Most participants' Body Mass Index (BMI) was regular (58%) in both groups. The majority of patients complained of otorrhea >90%, followed by hearing loss (Group 1 = 48% and Group 2 = 82%). Most patients had unilateral otitis media, as many as 151 patients (74%) in Group 1 and 29 patients (87%) in Group 2.

The examination of the patient's ear canal diameter mostly showed normal, with as many as 196 patients (96%) in Group 1 and 29 patients (86%) in Group 2. Pathological tissue in granulation was found in 23% of patients in Group 1 and 73% of patients in Group 2. Attic perforation in Group 1 was only found in 3 patients (1%), while 5 patients (16%) in Group 2. Moreover, total perforation in Group 1 was found in 25 patients (12%) and 6 patients (18%) in Group 2. Cholesteatoma was found in 47% and 79% of patients in Group 1 and Group 2, respectively (Table 1).

CSOM complications were found in 35 patients (17%) and 33 patients (100%) in Group 1 and Group 2. The most intratemporal complications found in Group 1 were retro auricular fistula (5%) and facial nerve paralysis (36%) in Group 2. Intracranial complications were not found in Group 1, but 12% in Group 2. Audiogram results of conductive hearing loss were found in 71% and 58% of patients in Group 1 and Group 2. 11% mixed hearing loss and 9% sensorineural hearing loss were found in Group 1 and 27% and 15% in Group 2, respectively.

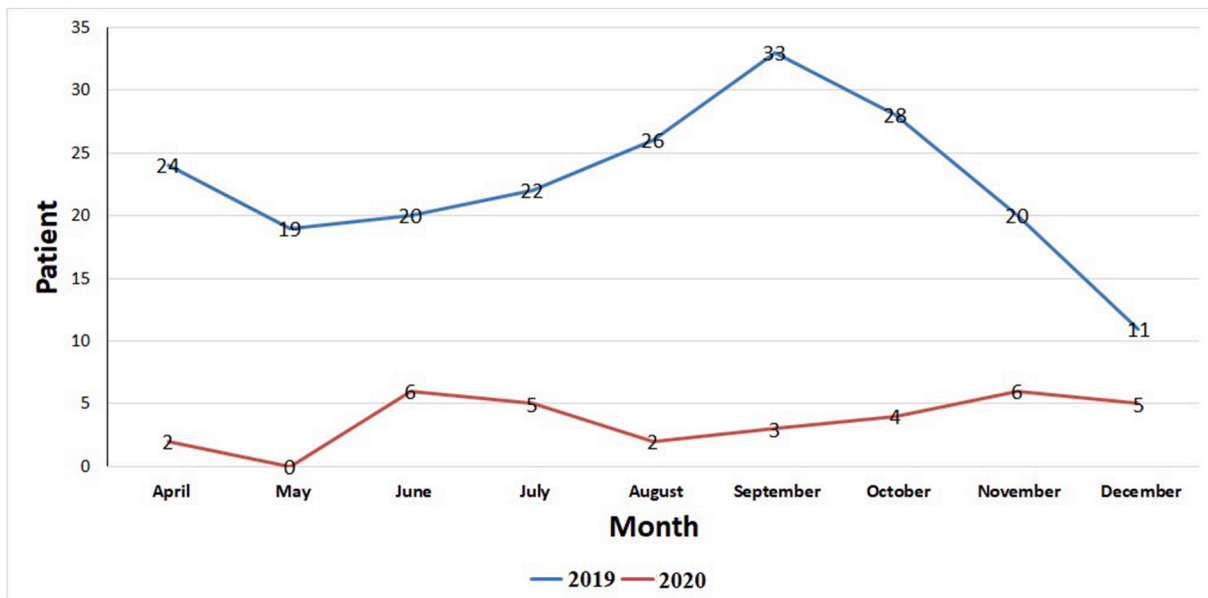


Fig. 1. Comparison of the number of otitis media surgeries in April–December 2019 and 2020.



Fig. 2. Results of linear regression test on the number of otitis media surgeries in April–December 2019 and 2020.

3.2. Comparison of CSOM surgeries before and during the COVID-19 pandemic

There were 204 and 33 surgeries performed in April–December 2019 and April–December 2020, respectively. The patient was followed up post-surgery for 6 months. A comparison of the number of surgeries in April–December 2019 and 2020 can be seen in Fig. 1.

The data analysis results on the number of surgeries in 2019 and 2020 obtained $r = 0.691$ and $p < 0.001$ (Fig. 2). The mean number of patients per month in Group 1 and Group 2 was 23 ± 6 patients and 4 ± 2 patients, respectively ($t = 2.365$; $p < 0.001$; Fig. 3).

The most surgeries performed in 2019 and 2020 were canal wall up with tympanoplasty (61%) and canal wall down with tympanoplasty (70%). There were 4 canaloplasty operations in Group 2. Facial nerve decompression was primarily performed in Group 2.

4. Discussion

33 patients who underwent surgery during the pandemic were not confirmed COVID-19 based on the PCR swab examination. The guidelines for surgery during the COVID-19 pandemic recommend that additional disinfection procedures and the implementation of the COVID-19 diagnostic procedure should be carried out before surgery [13,14]. Additional measures to prevent the spread of aerosols during surgery are highly emphasized and applied according to standardized guidelines, bearing in mind that surgical procedures performed on the ear and temporal bone with drilling and suctioning can induce aerosol generation. The COVID-19 preparation and prevention procedures make the surgery process take longer and high costs [13,15].

Regulations issued by the government and hospitals to increase the capacity of intensive care units and prioritize COVID-19 patients have an

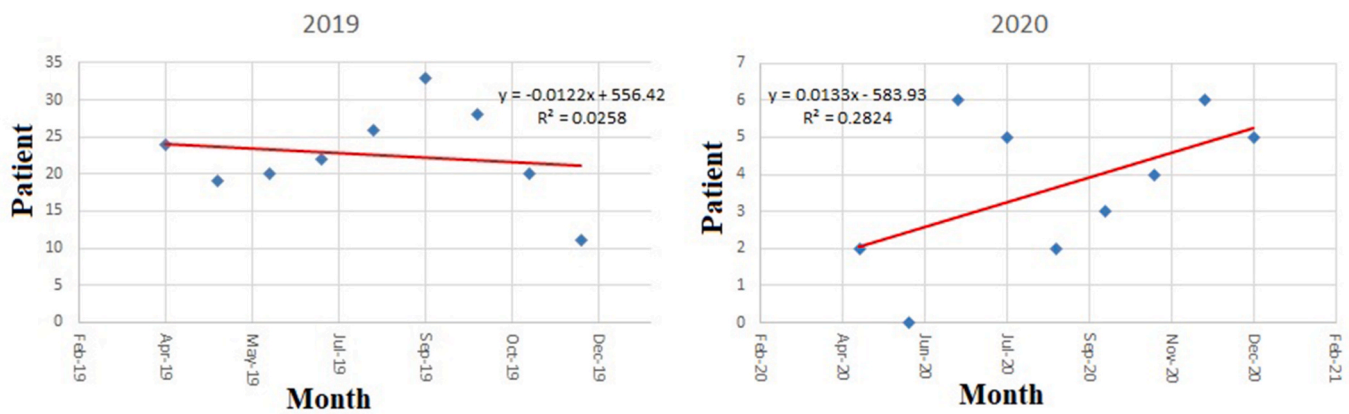


Fig. 3. Comparison of linear regression test results on the number of otitis media surgeries in April–December 2019 and 2020.

impact on empowering human resources in other hospital rooms, including surgery rooms, on supporting the management of the COVID-19 pandemic in hospitals [16,17]. This reorganization resulted in a reduced amount of surgeries [9]. The rules for restricting patients and surgery coupled with almost all patients with mild to moderate degrees who had previously been scheduled for surgery refused to take action when confirmed via telephone. The main reason for refusal is that patients are afraid to come to the hospital, which has become the main Covid-19 referral hospital for fear of contracting [18].

A decrease in the total volume of surgery in the ENT department during the COVID-19 pandemic has also been reported in Italy and France [15,19]. Italy reported a 50.77% decrease in the total volume of surgery since the lockdown in Italy on 10 March 2020. The data were taken from March 10–April 28, 2020 and compared with a similar period in the previous year [15,20]. The decrease in the total volume of ENT surgery in 3 hospitals in Paris was 84% from March 17–April 17, 2020, compared to a similar period in the previous year [19].

A total of 3 patients in Group 2 with intracranial complications (cerebral abscess) underwent surgery simultaneously as craniotomy for abscess evacuation by a neurosurgeon. All CSOM patients who underwent surgery during the pandemic showed good recovery during a 3–6-month evaluation after the procedure.

During the COVID-19 pandemic, patients who previously had the opportunity to seek treatment earlier had to postpone their plan while the progress of the disease continued. This delay in examination and diagnosis may cause the patient to come with a more severe degree or already have a more complex general condition. In addition, delayed surgery risk disease progression complications that has spread, especially CSOM with cholesteatoma [21,22].

The limitations of our data are the limitations of data collection during the COVID-19 pandemic, in which the universal precaution protocol needs to be considered carefully. The results of this study can be used as an evaluation for CSOM management that requires surgery because the ongoing disease progression due to delays in treatment during the COVID-19 pandemic needs to find a solution.

5. Conclusion

The Covid-19 pandemic impact a decrease of 83.7% of the total volume of CSOM surgeries in the April–December 2020 period. Patients who come for treatment during the April–December 2020 period are CSOM patients with complications. The positivity rate in Indonesia is still high, and the lockdown is still in effect, so hospitals must be prepared for post-crisis management.

Ethical approval

We have conducted an ethical approval base on the Declaration of Helsinki at the Health Research Ethics Committee in Dr. Hasan Sadikin General Hospital, Bandung, Indonesia.

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None.

Author contribution

All authors contributed toward data analysis, drafting and revising the paper, gave final approval of the version to be published and agree to be accountable for all aspects of the work.

Registration of research studies

1. Name of the registry: Research Ethics Committee Universitas Padjadjaran, Bandung, Indonesia.
2. Unique Identifying number or registration ID: 1278/UN6.KEP/EC/2020.
3. Hyperlink to your specific registration (must be publicly accessible and will be checked): .

Guarantor

Lina Lasminingrum is the person in charge of the publication of our manuscript.

Consent

All participants are required to fill out an informed consent.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Declaration of competing interest

Lina Lasminingrum, Sally Mahdiani, Arif Dermawan, and Muthiah Miftahul Husnayain declare that they have no conflict of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amsu.2022.103921>.

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