

Evaluation and Analysis of Quality of Life Before and After Surgery in Patients with Middle Ear Cholesteatoma

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Abstract: *Objective:* To study the difference in quality of life before and after surgery in patients with middle ear cholesteatoma. *Methods:* Our hospital received 113 patients with middle ear cholesteatoma who underwent surgical treatment from August 2020 to March 2023 as the subjects of this study. The ZCMEI-21 scoring scale was used to evaluate the patients' preoperative and postoperative quality of life. At the same time, the patients' age, gender, occupation, living environment, and preoperative and postoperative bone conduction hearing thresholds, air conduction hearing thresholds, and air-bone conduction differences were understood. *Results:* There were significant differences in preoperative and postoperative ZCMEI-21 scores, bone conduction hearing thresholds, air conduction hearing thresholds, and air-bone conduction difference values among patients with different ages, genders, occupations, and living environments, $P < 0.05$. *Conclusion:* Surgical treatment can significantly improve the quality of life of patients with middle ear cholesteatoma. Therefore, surgical treatment can be promoted.

Keywords: Middle ear cholesteatoma; Surgical treatment; ZCMEI-21 score; Bone conduction hearing threshold; Air conduction hearing threshold; Air-bone conduction difference

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1. Introduction

Middle ear cholesteatoma can cause patients to develop symptoms such as ear discharge, pus discharge, hearing loss, tinnitus, vertigo, facial nerve paralysis, etc., which have a greater impact on patients. If not treated in time, it can lead to intracranial complications and endanger the patient's life. When treating this disease, surgery is a common and efficient treatment method, which helps to effectively improve the patient's condition. However, surgery is highly risky, and patients may develop a variety of complications after surgery, which will have a greater impact on the patient's prognosis and quality of life. In this regard, in order to reduce the adverse effects on patients, it is necessary to promptly evaluate the relevant preoperative and postoperative indicators of the patients, and use this to analyze the specific impact on the patient's quality of life, and then improve and promote surgical treatment. Therefore, this article will mainly study the difference in quality of life between patients with middle ear cholesteatoma before and after surgery. The report is as follows:

2. Materials and methods

2.1. General information

113 patients who received surgical treatment of middle ear cholesteatoma in our hospital from August 2020 to March 2023 were selected as the subjects of this study. Inclusion criteria: (1) Patients with middle ear cholesteatoma all meet the diagnostic criteria; (2) Patients meet the surgical indications; (3) Patients whose personal information meets the research requirements; d. Patients actively cooperate with various evaluations and testing. Exclusion criteria: (1) Patients with congenital ear canal structural abnormalities and deafness; (2) Patients with other diseases; (3) Patients with failed surgical treatment; (4) Patients with mental disorders.

2.2. Method

Surgical process: The patient is under general anesthesia with tracheal intubation. With the help of a 2.7mm rigid otoscope, an incision is made on the posterior wall of the external auditory canal 1.0-1.5cm away from the bone ring. During this process, the specific angle of the rigid otoscope can be reasonably adjusted according to surgical needs to fully expose the tympanic cavity and sinus tympanum, observe the distribution of diseased tissue, and comprehensively remove it. If the patient has severe bleeding, gelfoam sponge can be used to compress and stop the bleeding in time; if the patient has symptoms of ossicular chain loss, an artificial ossicle prosthesis can be implanted into it; if the patient has symptoms of periosteal defect, it needs to be repaired with the tragus cartilage-perichondrium complex. After the surgical area is inspected, the incision is sutured, the external auditory canal periosteal flap is reset, and covered with Gelfoam beads. All patients received anti-inflammatory and anti-infective treatment after surgery.

The ZCMEI-21 scoring scale was used to evaluate the patient's quality of life before and after surgery, and at the same time, the patient's age, gender, occupation, living environment, preoperative and postoperative bone conduction hearing threshold, air conduction hearing threshold, and air-bone conduction difference were assessed.

2.3. Observation indicators

The ZCMEI-21 score is based on the Chinese version of the Zurich Chronic Otitis Media Scale, which includes ear signs and symptoms, hearing level, psychosocial impact, medical resource usage, etc. The full scores are 20 points, 20 points, 32 points, and 12 points, respectively. The lower the score, the less impact the patient's middle ear cholesteatoma has on the patient's quality of life.

2.4. Statistical analysis

This study used SPSS 21.0 statistical software for relevant data analysis. Measurement data are represented by mean \pm standard deviation (SD), t is used for measurement testing, count data is represented by (n, %), and χ^2 test is used. $P < 0.05$ is a significant difference.

3. Results

3.1. Comparison of ZCMEI-21 scores

There were significant differences in preoperative and postoperative ZCMEI-21 scores among patients with different ages, genders, occupations, and living environments, $P < 0.05$ (Table 1).

Table 1. Comparison of ZCMEI-21 scores (mean \pm SD, points)

Indicators (n = 113)		Age (years)			Gender		Career			Living environment	
		< 40 (n = 38)	40-60 (n = 46)	> 60 (n = 29)	Male (n = 67)	Female (n = 46)	Unemployed, retired (n = 37)	Farmers, workers (n = 41)	Employees, individuals (n = 35)	Rural area (n = 61)	City (n = 52)
Ear symptoms	Before surgery	6.74 \pm 1.98	6.99 \pm 2.12	6.86 \pm 2.07	6.81 \pm 1.96	6.85 \pm 1.97	6.79 \pm 2.05	6.82 \pm 2.01	6.85 \pm 2.01	6.89 \pm 1.98	6.91 \pm 1.99
	After surgery	1.05 \pm 0.54	1.03 \pm 0.62	1.16 \pm 0.61	1.17 \pm 0.61	1.09 \pm 0.63	1.19 \pm 0.65	1.20 \pm 0.68	1.21 \pm 0.67	1.21 \pm 0.66	1.18 \pm 0.63
	<i>t</i>	17.091	18.301	14.224	22.490	18.888	15.839	16.959	15.748	21.255	19.795
	<i>P</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hearing level	Before surgery	8.16 \pm 3.25	8.23 \pm 3.26	8.24 \pm 3.24	8.19 \pm 3.22	8.24 \pm 3.25	8.22 \pm 3.24	8.17 \pm 3.21	8.20 \pm 3.23	8.25 \pm 3.24	8.21 \pm 3.22
	After surgery	4.56 \pm 3.72	4.58 \pm 3.69	4.62 \pm 3.71	4.67 \pm 3.72	4.63 \pm 3.69	4.73 \pm 3.68	4.66 \pm 3.69	4.65 \pm 3.67	4.63 \pm 3.66	4.53 \pm 3.62
	<i>t</i>	4.493	5.028	3.958	5.856	4.979	4.330	4.595	4.296	5.784	5.477
	<i>P</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Psychosocial impact	Before surgery	12.86 \pm 4.47	12.94 \pm 4.52	12.95 \pm 4.56	12.97 \pm 4.62	12.89 \pm 4.59	12.97 \pm 4.61	12.93 \pm 4.57	12.95 \pm 4.58	12.96 \pm 4.63	12.94 \pm 4.66
	After surgery	6.78 \pm 3.11	6.81 \pm 3.12	6.84 \pm 3.15	6.76 \pm 3.16	6.75 \pm 3.17	6.79 \pm 3.21	6.76 \pm 3.18	6.75 \pm 3.19	6.74 \pm 3.16	6.71 \pm 3.13
	<i>t</i>	6.883	7.570	5.937	9.081	7.465	6.692	7.096	6.572	8.666	8.003
	<i>P</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Medical resource use	Before surgery	4.11 \pm 1.86	4.12 \pm 1.89	4.13 \pm 1.88	4.13 \pm 1.84	4.12 \pm 1.83	4.16 \pm 1.87	4.15 \pm 1.82	4.13 \pm 1.82	4.16 \pm 1.83	4.13 \pm 1.85
	After surgery	0.81 \pm 0.69	0.82 \pm 0.67	0.84 \pm 0.71	0.83 \pm 0.68	0.82 \pm 0.67	0.86 \pm 0.69	0.85 \pm 0.67	0.84 \pm 0.68	0.91 \pm 0.68	0.89 \pm 0.66
	<i>t</i>	10.254	11.162	8.817	13.770	11.485	10.071	10.895	10.018	13.002	11.895
	<i>P</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

3.2. Compare bone conduction hearing threshold, air conduction hearing threshold, and air-bone conduction difference

There were significant differences in preoperative and postoperative bone conduction hearing thresholds, air conduction hearing thresholds, and air-bone conduction difference values among patients with different ages, genders, occupations, and living environments, $P < 0.05$ (Table 2).

Table 2. Comparison of bone conduction hearing threshold, air conduction hearing threshold, and air-bone conduction difference (mean \pm SD, dB)

Indicators (n = 113)		Age (years)			Gender		Career			Living environment	
		< 40 (n = 38)	40-60 (n = 46)	>60 (n = 29)	Male (n = 67)	Female (n = 46)	Unemployed, retired (n = 37)	Farmers, workers (n = 41)	Employees, individuals (n = 35)	Rural area (n = 61)	City (n = 52)
Bone conduction hearing threshold	Before surgery	16.62 \pm 4.85	16.64 \pm 4.87	16.69 \pm 4.91	16.66 \pm 4.89	16.65 \pm 4.88	16.71 \pm 4.83	16.66 \pm 4.85	16.68 \pm 4.86	16.72 \pm 4.91	16.68 \pm 4.86
	After surgery	8.49 \pm 2.31	8.51 \pm 2.29	8.53 \pm 2.31	8.51 \pm 2.28	8.52 \pm 2.31	8.56 \pm 2.33	8.51 \pm 2.37	8.52 \pm 2.36	8.53 \pm 2.33	8.49 \pm 2.29
	<i>t</i>	9.329	10.246	0.098	12.364	10.213	9.244	9.667	8.935	11.770	10.993
	<i>P</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Air conduction hearing threshold	Before surgery	53.79 \pm 8.42	53.82 \pm 8.41	53.82 \pm 8.46	53.81 \pm 8.43	53.82 \pm 8.45	53.87 \pm 8.36	53.84 \pm 8.32	53.79 \pm 8.39	53.87 \pm 8.44	53.83 \pm 8.45
	After surgery	18.62 \pm 3.15	18.65 \pm 3.17	18.67 \pm 3.19	18.66 \pm 3.23	18.69 \pm 3.24	18.71 \pm 3.23	18.70 \pm 3.24	18.69 \pm 3.25	18.72 \pm 3.18	18.78 \pm 3.16
	<i>t</i>	24.116	26.540	20.936	31.871	26.328	23.863	25.201	23.079	30.597	28.016
	<i>P</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Poor air-bone conduction	Before surgery	38.16 \pm 4.72	37.18 \pm 4.71	38.22 \pm 4.73	38.19 \pm 4.72	38.21 \pm 4.73	38.25 \pm 4.73	38.23 \pm 4.72	38.24 \pm 4.71	38.31 \pm 4.74	38.27 \pm 4.72
	After surgery	9.79 \pm 0.26	9.82 \pm 0.25	9.83 \pm 0.24	9.81 \pm 0.25	9.82 \pm 0.24	9.86 \pm 0.23	9.83 \pm 0.22	9.84 \pm 0.24	9.86 \pm 0.25	9.83 \pm 0.23
	<i>t</i>	36.996	39.343	32.281	49.147	40.656	36.466	38.486	35.626	46.813	43.399
	<i>P</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

4. Discussion

In the treatment of middle ear cholesteatoma, although surgical treatment can effectively improve the patient's symptoms, this treatment method is highly risky and can easily lead to complications such as hearing loss, dizziness, facial nerve paralysis, sensory dysfunction, tinnitus, and external auditory canal stenosis. It has a great impact on the patient's prognosis, which in turn affects the patient's quality of life [1]. In this regard, in order to reduce the adverse effects on patients, it is necessary to understand the patient's prognostic status promptly, and then detect relevant indicators to evaluate the effectiveness and value of surgical treatment methods and improve surgical treatment measures [2,3]. In this study, doctors classified the patients according to their age, gender, occupation and living environment, and then used the ZCMEI-21 scoring scale to comprehensively evaluate their ear symptoms, hearing level, psychosocial impact, medical resource usage, etc. The scores were negatively correlated with the patient's quality of life. The final results showed that the scores of the patients after surgery were significantly lower than before the surgery, and the gaps were significantly larger [4,5]. This shows that surgical treatment can significantly improve patients' quality of life and reduce adverse effects on patients [6]. This study also specifically measured the patient's bone conduction hearing threshold, air conduction hearing threshold, and air-bone conduction difference values. The patients' postoperative values were significantly lower than those before surgery, and the comparison data also had significant statistical significance. This shows that the patient's postoperative hearing threshold recovery is better, and the adverse effects on the patient are also reduced. The value of surgical treatment is thus effectively demonstrated [7].

During the surgical treatment of middle ear cholesteatoma, minimally invasive otoscopic surgery has been used clinically in recent years. This surgical method is not only minimally invasive, but can also understand the deep structure

of the patient's ear canal, which can ensure the accuracy of surgical treatment measures, reduce surgical risks, and reduce adverse effects on patients^[8,9]. Therefore, during clinical treatment, doctors can also pay more attention to this surgical method, fully ensure the suitability of the surgical method, and promote the continuous improvement of surgical treatment effects^[10].

In summary, surgical treatment can significantly improve the quality of life of patients with middle ear cholesteatoma. Therefore, surgical treatment can be promoted.

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Disclosure statement

The author declares no conflict of interest.

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