



## BEZOLD' ABSCESS : REVIEW OF LITERATURE

**Dr. Rajashri S.****Mane\***

Prof. &amp; HOD Otorhinolaryngology, D. Y. Patil Medical College, Kolhapur.

\*Corresponding Author

**Dr. Jyothi****Lakshmi. K. S**

Junior Resident, Department of Otorhinolaryngology, D. Y. Patil Medical College,

Kolhapur.

**Dr. Balasaheb Patil**

Professor Department of Otorhinolaryngology, D. Y. Patil Medical College, Kolhapur.

**Dr. Anjana Mohite**

Assoc Professor Department of Otorhinolaryngology, D. Y. Patil Medical College,

Kolhapur.

**ABSTRACT**

Cholesteatoma is associated with multiple complications either extracranial or intracranial. Mastoiditis and mastoid abscess are the most common extracranial complications. Cholesteatoma with Bezold's abscess is a rare condition. Only 35 studies are reported in the literature. In this article we review all case reports from 2000 till date.

**KEYWORDS :** Complication of CSOM, Cholesteatoma, Bezold's Abscess**INTRODUCTION**

Cholesteatoma is a disease which erodes bone of the middle ear cleft including middle ear, mastoid or petrous bone. If cholesteatoma is not properly removed surgically, recurrence is likely. It has got a capacity for progressive and independent growth leading to life threatening complications. These complications are classified as Extra cranial and Intracranial. Mastoid abscess, petrositis, labyrinthine fistula and Facial palsy are extra cranial complications whereas meningitis, subdural abscess, lateral sinus thrombosis and extradural abscess are the Intracranial complications<sup>1</sup>. Bezold's abscess is one of a rare type of mastoid abscess occurring in neck.

Friedrich von Bezold first described 'Bezold abscess' as a complication of otitis media<sup>2</sup>. He published a paper describing the effects of pus escaping through medial side of the mastoid process into the incisura digastrica (digastric groove). Thus, it led to an abscess in the neck<sup>2</sup>. This variety of abscess was known as Bezold's abscess. In his classic description, the pus spread along the digastric muscle to the chin, filling the retro maxillary fossa, and along the course of the occipital artery. Bezold observed that pus tracked along sternocleidomastoid & digastric muscle. If it reached the deep muscles of the neck, it might extend to the transverse processes of the vertebrae as low as the second thoracic vertebra.

The present day literature describes a Bezold's abscess as an abscess in which pus tracks down along the sternocleidomastoid muscle, through the tip of the mastoid process<sup>3</sup>. As it is a rare complication of squamous type of Otitis media, very few cases are reported in the literature. In one review article, 35 cases of Bezold's abscess have been reported between 1967 and 2001<sup>4</sup>. Another review published 18 cases in Japanese literature between 1960 and 2000<sup>2</sup>. In this review article all the case reports from 2000 till date are studied to find the frequency of disease, demographic distribution, predisposing factors and change in the trend of management.

**Review of Literature**

Bezold Abscess is a rare deep neck abscess resulting from cholesteatoma. It was first described by a German Otologist Dr. Friedrich Bezold in 1881. The number of reported cases of Bezold abscesses have significantly decreased after the introduction of antibiotics<sup>5</sup>. We have searched for all cases reported in English literature between 2000 and 2019 using the words "Bezold's abscess" in the 'Pub Med' and found 20 cases as summarized in [Table 1]. Eight cases that are reported in other literatures, are excluded in this review.

The mastoid tip is composed of thin-walled air cells. It has two walls. The medial mastoid wall is composed of thinner bone than that of the lateral wall. The lateral aspect serves as the insertion point for the digastric, sternocleidomastoid, splenius capitis, and longissimus capitis muscles. Pus in the mastoid cells erodes through the area of

least resistance, the mastoid tip, which is inferior and medial and then track down the muscles arising from mastoid tip.<sup>6</sup> Thus, abscess is formed deep in the neck musculature which delays its diagnosis. The other causes leading to development of abscess are low antibiotic dose or of less duration, development of more resistant pathogen species and unfamiliarity of the disease to the physician. Those with a history of cholesteatoma or previous mastoid surgery appear to be at increased risk for Bezold's abscess (6 of 21, 28.6%). The cholesteatoma may block the aditus and direct the inflammatory process to the mastoid tip. The pattern of mastoid pneumatization is the main factor behind developing Bezold's abscess. This explains why the incidence of Bezold's abscess is more in adults than pediatrics.

Bezold's abscess is seen more in males (13 of 20, 62%) than in females (8 of 20, 38%). It is seen mainly in adults (14 of 20, 66.6%) and less commonly in pediatric (7 of 20, 33.4%). The time latency between the presentation of the patient and the diagnosis of Bezold's abscess is between 2 days to 2 weeks. Patients typically present with gradual fever, otorrhea, otalgia, and neck tenderness with or without obvious swelling in neck. They may also have torticollis, restriction in range of motion, odynophagia, or trismus. Patients may not appear toxic and often appear less ill than patients with mastoiditis without Bezold abscess. This difference may be attributed to the rupture of the mastoid air cells, alleviating some of the discomfort (similar to the decreased pain seen in perforative stage of acute otitis media). Physical examination findings are suggestive of mastoiditis (postauricular erythema, swelling, auricular displacement) and tenderness along the sternocleidomastoid muscle.

CT imaging of the temporal bone and neck is the most useful investigation for both diagnosis as well as treatment planning. Advantages of CT over MRI are availability, short imaging time which allows imaging in children without sedation or general anesthesia, and assessment of bony erosion. However, MRI is superior for the assessment of intracranial complications<sup>7</sup>.

The most common causative pathogens responsible are Gram-positive organisms, in particular the streptococci species, although Bezold's abscess can be caused by all types of organisms. In this review, 7 cases showed Streptococci species. *Staphylococcus* was identified in 6 cases, acid-fast bacilli in one case, Gram-negative (*Pseudomonas aeruginosa*) in one and anaerobes (*Peptostreptococcus*) in one case.

In almost all cases, the gold standard management was surgery i.e. incision & drainage of abscess followed by mastoidectomy. All the cases were given IV antibiotics. Mastoidectomy was not done in 5 cases out of which two cases were pediatrics where the mastoid was not fully pneumatized. This shows that the surgical treatment can be tailored according to the pneumatization of the mastoid bone and the extension of neck abscess.

**Table-1 Reported cases of Bezold's abscess in English literature included in the study**

Sr. NO	Author	Year of publication	Cases No.	Age / Sex	Management	Culture	Coexistence complications /comorbidities
1	Marioni et al <sup>4</sup>	2001	1	18/F	IV cefotaxime	Not available	None
2	Zapanta et al <sup>8</sup>	2001	1	17/F	Mastoidectomy+ Decompression of epidural abscess + I & D +IV clindamycin, ceftriaxone, and vancomycin+ myringotomy and tube	Alpha-hemolytic Streptococci	Multiple dural sinus thrombosis
3	Uchida et al <sup>2</sup>	2002	1	25/M	Mastoidectomy + I and D + IV antibiotics	Staphylo-coccus+ V Legionella species	cholesteatoma
4	Jose et al <sup>9</sup>	2003	1	19/M	I and D+IV flucloxacillin	Staphylococcus aureus	None
5	Schondorf et al <sup>10</sup>	2004	1	10wk/ F	Mastoidectomy+ IV antibiotic	No growth	None
6	Ching et al <sup>11</sup>	2006	1	14/M	Mastoidectomy+ Iv Ceftriaxone and metronidazole	Streptococcus milleri	Lateral sinus Thrombosis, Post -streptococcal glomerulo-nephritis
7	Bhat and Manjunath <sup>12</sup>	2007	1	12/M	I and D + IV ceftazidime + temporal craniotomy+ radical mastoidectomy	Pseudomonas aeruginosa	Pyogenic meningitis+ Cholesteatoma+ sigmoid Sinus thrombosis+ cerebellar abscess+ CSF Otorrhoea+ Perilymph fistula
8	Mc Mullan <sup>5</sup>	2009	1	8/M	Mastoidectomy+ insertion of grommet tube+ I and D + IV ceftriaxone	No growth	Sigmoid Sinus thrombosis
9	Vlastos et al <sup>13</sup>	2010	1	3/F	Mastoidectomy + IV clindamycin & ceftriaxone	Streptococcus pneumoniae	Sigmoid Sinus Thrombosis & Occipital osteomyelitis
10	Patel et al <sup>14</sup>	2010	1	35/M	Mastoidectomy + I & D + IV Piperacillin/Tazobactum& vancomycin	Not available	HIV
11	Kamal G Effat <sup>15</sup>	2013	1	19/M	IV Cefuroxime metronidazole & Amikacin	MRSA & Gram negative	None
12	Yu-Hsuan Lin et al <sup>16</sup>	2015	1	49/M	Neck debridement with pus drainage excisional biopsy of the ear canal mass mastoidectomy	Klebsiella pneumonia	None
13	Hussain Al-Baharna et al <sup>17</sup>	2016	1	73/M	IV ceftriaxone cortical mastoidectomy , I &D	Peptostreptococcus	Diabetes Mellitus II Hypertension Renal Impairment,Cardio myopathy
14	Nasir F et al <sup>18</sup>	2017	1	52/M	MRM, Drainage	Klebsiella	Facial Nerve Palsy
15	Aziz et al <sup>19</sup>	2018	1	14/M	IV ceftriaxone, Vancomycin , Myringotomy Cortical Mastoidectomy	Streptococcus pneumoniae	Lateral Sinus Thrombosis
16	Sudhagar et al <sup>20</sup>	2018	1	15/F	MRM, Wide meatoplasty, Anti-Tuberculous Treatment CATEGORY 1	MSSA	Tuberculosis
17	Kohta Katayama et al <sup>21</sup>	2018	1	52/M	IVceftriaxone & Metronidazole Mastoidectomy	Streptococcus	Diabetes Mellitus Type II
18	Sujatha S et al <sup>22</sup>	2019	1	35/M	USG guided aspiration MRM with I &D	Not available	cholesteatoma
19	Khurram Malik et al <sup>23</sup>	2019	1	55/M	IV Vancomycin Metronidazole Cefepime ,Tympano -mastoidectomy, Canaloplasty I &D	Staphylococcus	None
20	Arozarena et al <sup>24</sup>	2020	1	27/F	IV Cefuroxime ,I &D, cortical mastoidectomy	Acinetobacter Staphylococcus aureus	Juvenile Rheumatoid Arthritis

**CONCLUSION**

Bezold's abscess is a rare complication of otitis media. It occurs when the abscess escapes from the mastoid cavity to the sternocleidomastoid muscle through the digastrics ridge. This review supports the fact that the pattern of mastoid pneumatization is the main factor behind developing Bezold's abscess. There are more cases diagnosed nowadays due to improvement of imaging technology. However, there is no difference in the standard care of management over the last 20 years.

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