International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2016): 79.57 | Impact Factor (2015): 6.391

Does Antibiotic have a Role in the Medical Management of Otitis Media with Effussion?

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Abstract: ***The role of infection in pathogenesis of OME is still the subject of debate. In this study, bacterial growth (especially Alloiococcus) was found in (77.93%) of cultured samples. This encourages usage of adequate course (2 weeks) of the appropriate dose of antibiotic (especially Amoxicillin and clavunic acid) in eradication of the micro-organism from the middle ear, subsequently the inflammatory process of the mucosa, helping in early resolution of OME without its complication***

Keywords: otitis media, effusion, antibiotic, Alloiococcus Otitidis

1. Introduction

Persistant Otitis media with effusion (OME) in children may cause hypoacusis affecting the intellectual development and language delay. Some cases turn into adhesive otitis, that is difficult to cure using surgical techniques. In advanced cases, the development of both attic and mesotympanic retraction pockets is possible with the later development of cholesteatomatous processes.[8] Early diagnosis and management of the OME is important to avoid this complications.[10] Surgical treatment (as ventilation tube insertion) may be followed by complications as tympanosclerosis atelectasis, residual perforations and rarely cholesteatoma formation.[6] Early and effective medical treatment is essential and has the highest priority in the management of OME.[1] The role of infection in pathogenesis of OME is still the subject of debate. Several studies have established that bacteria can be isolated from a substantial proportion of chronic middle ear effusions with the incidence of acute otitis media is higher among children with established effusions.

Usage of antibiotic in the medical treatment of OME, its type and efficacy depends on the type of bacteria involved in the pathogenesis of OME.[2] In this study, we tried to determine the prevalence of bacteria in the pathogenesis of OME and the appropriate antibiotic used in the management of OME

2. Patients and Methods

This cross-sectional and observational study was done between May 2015 till February 2017, including Dar-Alshefaa ORL center, Egypt, while the culture and sensitivity tests were done in Elrashedy laboratory, Egypt. It included 120 patients suffering from primary otitis media with effusion with age between 3 to 14 years. All this patients were indicated for surgical tratment in the form of tympanostomy tubes insertion ,after failure of adequate medical ttt for at least three months. We excluded all patients with recurrent otitis media with effusion, previous ear surgery, chronic suppurative otitis media and any recent upper respiratory tract infections. Any given antibiotic , should be stopped at least 2 weeks before surgery. The patient should has the criteria of otitis media with effusion as continuous fullness, retracted tympanic membrane with type B tympanogram. After signed informed consent by the parents, and under general anesthesia with complete aseptic conditions with sterilization of the external auditory canal by using microscope, sample was taken from the antro-inferior quadrant of the tympanic membrane (tympanocentesis) and then sent to the laboratory within 45 minutes. Gram staining was performed. Blood agar, chocolate agar, MacConkey agar, Sabouraud agar, Brucella agar and Brain-Heart liquid enrichment medium was inoculated for all samples. All media were incubated at 35^0c for 48 hours in a microaerophilic atmosphere, and another samples in anaerobiosis. Antibiotic sensitivity was determined by disc-diffusion method.

3. Results

Our study was done in a group of patients with age ranged from 3 to 14 years old with the mean age 8±487 years, included 120 patients, 56 (46.66%) females and 64 (53.33%) males. 93 (77.5%) were bilateral , while 27 (22.5%) were unilateral [19 (15.83%) right, 8 (6.63%) left], So there were 213 taken samples. The aspirated fluid was serous in 92 (43.19%) samples, while it was mucoid in 121 (56.80%) samples. No growth was found in 47 (22.07%) samples, while oraganisms were found in 166 (77.93%) samples, 152 (71.36%) were mono-bacterial growth, while 14 (6.57%) were poly-bacterial growth. Alloiococcus Otitidis bacteria was found as mono-bacterial growth in 67 (31.45%) samples. Haemophilus influenza (not serotype B) was found as mono-bacterial growth in 43 (20.18%) samples, while coagulase-negative staphylococci (S epidermidis) was found in 13 (6.10%), Streptococcus pneumonia was in 14(6.57%), Staphylococcus aureus was in 3 (1.40%), M.catarrhalis was in 12(5.63%). A combination of Alloiococcus Otitidis bacteria and Haemophilus influenza bacteria was fonud in 4 (1.87%) poly-bacterial growth samples. Another combination included Haemophilus influenza bacteria with M.catarrhalis in 8 (3,75%) samples, St.pneumonia with M.catarrhalis in 2 (0.93%) samples. Culture and sensitivity

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testing revealed that Amoxicillin and clavunic acid is the drug of choice in 79 cultures (47.59% of growth cultures), while Cefuroxime in 29 cultures (17.46%), Cefoperazone in 22 cultures (13.25%), Clarithromycin in 16 cultures (9.63%), Amikacin in 11 cultures (6.62%) and Ampicillin-sulbactam in 9 cultures (5.42%).

Table 1: Growth

Growth	Number	Percentage (%)
No growth	47	22.07
A.otitidis	67	31.45
H.influenza	43	20.19
S epidermidis	13	6.10
St.pneumonia	14	6.57
S.aureus	3	1.40
M.catarrhalis	12	5.64
A.otitidis+ H.influenza	4	1.87
H.influenza+ M.catarrhalis	8	3.75
St.pneumonia+ M.catarrhalis	2	0.93

Table 2: Antibiotic sensitivity

ABS	n	Percentage (%)
Amoxicillin-clavunic acid	79	47.59
Cefuroxime	29	17.46
Cefoperazone	22	13.25
Clarithromycin	16	9.63
Amikacin	11	6.63
Ampicillin-sulbactam	9	5,42

4. Discussion

Early, effective and safe management of OME is essential to prevent its complications, without the need of any surgical intervention and its consequences. Many medical regimens are used that include local and systemic corticosteroids, antihistaminics, nasal decongestants. This variations are due to the different theories of the pathogenesis of OME. The role of antibiotics in the medical treatment of OME still the subject of debet. Its usage depends on the role of bacteria in the mechanism of development of OME. Many studies were done to clarify this role, Rosenfeld and Post did a meta-analysis of antibiotics used in the treatment of OME. They found that there was significant clinical and statistical cure rates in the use of antibiotics for the treatment of OME compared with the group which was not treated with antibiotics.[9] Lim identified bacteria in 45% of a series of 182 effusions, the commonest organism being Haemophilis influenzae.[7] However in another study, 47 of 108 patients were negative by culture.[11] Chapel showed acute effusions to be more closely associated with viral than with bacterial infections. Adenovirus, respiratory syncitial virus and influenza virus were most commonly implicated.[4] In this study, we tried to determine the prevalence of bacteria in the pathogenesis of OME and the appropriate antibiotic used in the management of OME.Our study was done in a group of patients with age ranged from 3 to 14 years old with the mean age 8±487 years, which is the commonest age of the incidence of OME. 120 patients included, 56 (46.66%) females and 64 (53.33%) males, 93 (77.5%) were bilateral while 27 (22.5%) were unilateral [19 (15.83%) right, 8 (6.63%) left], So there were 213 taken samples. The aspirated fluid was serous in 92 (43.19%) samples, while it was mucoid in 121 (56.80%) samples. The whole procedure was done in complete sterile condition to avoid any contamination. Any antibiotic used was stopped 2 weeks before. No growth was found in 47 (22.07%) samples, while oraganisms were found in 166 (77.93%) samples, which is statically significant (p0.001).152 (71.36%) were mono-bacterial growth, while 14 (6.57%) were poly-bacterial growth. Alloiococcus Otitidis bacteria was found as mono-bacterial growth in 67 (31.45%) samples. Haemophilus influenza (not serotype B) was found as mono-bacterial growth in 43 (20.18%) samples, while coagulase-negative staphylococci (S epidermidis) was found in 13 (6.10%), Streptococcus pneumonia was in 14(6.57%), Staphylococcus aureus was in 3 (1.40%), M.catarrhalis was in 12(5.63%). A combination of Alloiococcus Otitidis bacteria and Haemophilus influenza bacteria was fonud in 4 (1.87%) poly-bacterial growth samples. Another combination included Haemophilus influenza bacteria with M.catarrhalis in 8 (3,75%) samples, St.pneumonia with M.catarrhalis in 2 (0.93%) samples. Faden and Dryja were the first to suggest a role for this unique organism(A. Otitidis) in chronic OME.[3] Its best growth is on Brain-Heart agar containing 5% rabbit blood. The micro-organisms may not be the direct cause of the condition but may have an effect on the persistence of OME by stimulating epithelial cells and T lymphocytes and mixed populations of adenoid lymphocytes. Some authors demonstrated that children with OME had produced specific antibodies against *Aotitidis* in the middle ear cavity.[5] In our study, Culture and sensitivity testing revealed that Amoxicillin and clavunic acid is the drug of choice in 79 cultures (47.59% of growth cultures), while Cefuroxime in 29 cultures (17.46%), Cefoperazone in 22 cultures (13.25%), Clarithromycin in 16 cultures (9.63%), Amikacin in 11 cultures (6.62%) and Ampicillin-sulbactam in 9 cultures (5.42%). Alloiococcus Otitidis is resistant to macrolides and co-trimoxazole.

5. Conclusion

Prescence of high persentge of bacteria (especially Alloiococcus Otitidis)in cultured samples encourages usage of adequate course (2 weeks) of the appropriate dose of antibiotic (especially Amoxicillin and clavunic acid), helping in eradication of the micro-organisms from the middle ear, subsequently the inflammatory process of the mucosa, this helps in early resolution of OME without its complications.

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