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ORIGINAL PAPER

Randomized controlled pilot study to compare Homeopathy and Conventional therapy in Acute Otitis Media

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Objective: **To compare the effectiveness of Homeopathy and Conventional therapy in Acute Otitis Media (AOM).**
Method: **A randomized placebo-controlled parallel group pilot study of homeopathic vs conventional treatment for AOM was conducted in Jaipur, India. Patients were randomized by a computer generated random number list to receive either individualized homeopathic medicines in fifty millesimal (LM) potencies, or conventional treatment including analgesics, antipyretics and anti-inflammatory drugs. Patients who did not improve were prescribed antibiotics at the 3rd day. Outcomes were assessed by the Acute Otitis Media-Severity of Symptoms (AOM-SOS) Scale and Tympanic Membrane Examination over 21 days.**
Results: **81 patients were included, 80 completed follow-up: 41 for conventional and 40 for homeopathic treatment. In the Conventional group, all 40 (100%) patients were cured, in the Homeopathy group, 38 (95%) patients were cured while 02 (5%) patients were lost to the last two follow-up. By the 3rd day of treatment, 4 patients were cured in Homeopathy group but in Conventional group only one patient was cured. In the Conventional group antibiotics were prescribed in 39 (97.5%), no antibiotics were required in the Homeopathy group. 85% of patients were prescribed six homeopathic medicines.**
Conclusion: **Individualized homeopathy is an effective conventional treatment in AOM, there were no significant differences between groups in the main outcome. Symptomatic improvement was quicker in the Homeopathy group, and there was a large difference in antibiotic requirements, favouring homeopathy. Further work on a larger scale should be conducted.** *Homeopathy* (2012) **101**, 5–12.

Keywords: Homeopathy; Acute Otitis Media; Conventional; *Lycopodium*; *Sulphur*; *Pulsatilla*; *Chamomilla*; *Mercurius solubilis*; *Silicea*

Introduction

Acute Otitis Media (AOM) is the commonest ear infection in general paediatric practice. Three out of four children have at least one ear infection by their 3rd birthday.[1] The importance of the first attack of AOM in young children lies in the fact that subsequent long lasting dysfunction of the Eustachian tube may lead to chronic serous Otitis Media ('glue ear').[2]

AOM is inflammation of middle ear cleft. The Eustachian tube is the chief route by which infection reaches the middle ear. The most important cause is viral upper respiratory tract infection followed by other opportunistic infections like *Streptococcus pyrogen*, *Streptococcus pneumonia*, *Hemophilus influenza* and *Moraxella catarahalis*.[3]

The diagnosis of AOM is not always straightforward. It frequently occurs in children before they have learnt to talk. Many of the signs and symptoms found in children with AOM may also be observed in children without it.

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Signs and symptoms found are: sharp lancinating pain in ear, fever, increased pulse rate, malaise, signs include tugging, rubbing or holding of the ears, crying, fussiness or irritability, difficulty in sleeping, child becoming less playful or active, or eating less. Hearing impairment, clumsiness or problem with balance, discharges from ear (initially blood stained followed by mucopurulent) and tinnitus and voice resonance may follow.[4] In addition, the changes in tympanic membrane including colour changes from pearly white to pinkish white followed by red; the reduced translucency, haziness and opacity; the reduced mobility of the membrane and the bulging of the membrane.

Antibiotic use in early life is associated with the development of childhood asthma. Children who receive antibiotics within their first 6 months of life were three times more likely to develop allergies (to pets, ragweed, grass and dust mites), and more likely to suffer from asthma.[5] The conventional treatment approach of prescribing antibiotics injudiciously has led to increase of antibiotic resistance patients and failure in treatment of AOM consequently posing great threat to health. This has lead to interest in Complementary and Alternative Medicine (CAM) therapy as safer, treatment.[6] In randomized controlled study, children suffering from glue ear were treated with homeopathy and standard conventional treatment and hearing loss was assessed, the result showed 75% of children treated with homeopathy had normal tympanogram compared to 31% in group treated with conventional medicine.[7]

No research data from India is available to compare effectiveness of Homeopathy and Conventional therapy in AOM; therefore the Central Council for Research in Homoeopathy (CCRH) undertook this pilot study.

Table 1 AOM-SOS Scale

A. Symptom
(Responses to be filled by the investigator as per information supplied by parents/guardian)

Symptoms of AOM	No (0)	A little (1)	A lot (2)
Over the past 12 hrs, has your child been tugging, rubbing, or holding the ear(s) more than usual?			
Over the past 12 hrs, has your child been crying more than usual?			
Over the past 12 hrs, has your child been more irritable or fussy than usual?			
Over the past 12 hrs, has your child been having more difficulty sleeping than usual?			
Over the past 12 hrs, has your child been less playful or active than usual?			
Over the past 12 hrs, has your child been eating less than usual?			
Over the past 12 hrs, has your child been having fever or feeling warm to touch?			
TOTAL	**14**		

B. Tympanic Membrane Examination Scale

Tympanic membrane	0	1	2
i) Color	Pearly white	Pinkish with increased vascularity	Red
ii) Transparency	translucent	Haziness	Cloudy opacified
iii) Mobility	Normal	Restricted	Decreased mobility
iv) Bulging	Normal	Mild	Severe
TOTAL	**8**		

Total [AOM-SOS + Tympanic membrane examination score] =14+ 8= 22

Objectives

Primary objective: To compare the effectiveness of Homeopathy and Conventional therapy in AOM. Secondary objective: To evaluate number of patients requiring antibiotic treatment in both the groups.

Material & methods

Study design

The pilot study was a randomized controlled (parallel arm) trial conducted at Regional Research Institute of Homeopathy, Jaipur, (Rajasthan), India of CCRH from May 2009 to April 2010. The study was conducted in accordance with the Declaration of Helinsinki's on Human Experimentation and Good Clinical Practice (GCP). The necessary ethical clearance was obtained from Ethical Committee of CCRH to conduct the study. Written informed consent was obtained from each participant's parents/guardian before inclusion in the study. Patients fulfilling the inclusion criteria were included in the study. Tympanic Membrane Examination of each patient was conducted by ENT specialist on Tympanic Membrane Examination Scale at entry, at every follow-up on 3rd, 7th, 10th & 21st day. A standardized Patient Case Record Form (CRF) was used.

In the Homeopathy group, treatment was started after analysis and evaluation of symptoms on a totality of symptoms basis. Medicines were selected after repertorization by CARA Software.[8] In the conventional treatment group, 'Observation option'[9] was adopted for first 3 days: patients were given symptomatic treatment without antibiotics. In both groups, if less than 50% improvement was observed in first 3 days of treatment, antibiotics were given.

Severity of disease was assessed on Acute Otitis Media-Severity of Symptoms (AOM-SOS)[10] Scale in which score ranges from 0 to 14. Higher score indicated more severe symptoms. This scale consists of seven discrete items: tugging of ears, crying, irritability, difficulty in sleeping, diminished activity, diminished appetite and fever. Parents/guardian were asked to rate these symptoms, in comparison with the child's usual state, as 'none' 'a little', or 'a lot', with corresponding scores of 0, 1, & 2 (Table 1A).

An ENT specialist examined tympanic membrane for colour, transparency, mobility and bulging through the Tympanic Membrane Examination scale on three-point scale 0, 1 & 2 (Score range from 0 to 8, higher score indicating greater intensity) which was developed by CCRH with help of ENT specialist (Table 1B).

Randomization

Randomization was done by a computer generated random number list to receive either of the interventions (Homeopathy or Conventional therapy). The patient's enrolment numbers were used for the purpose of randomization. Both intervention groups were assessed on the same parameters. The parents/guardian and the research personnel remained unaware of the patient's group assigned throughout the study.

Inclusion and exclusion criteria

Children of both sexes, between 2 and 6 years of age. Earache of not more than 36 h duration. Tympanic membrane bulging with loss of landmarks.

Patients having any discharge or history of discharge from ear; history of convulsions; subperiosteal abscess of mastoid; grossly deviated nasal septum; suspected enlarged adenoids (persistent nasal discharge, snoring, history of tonsilar hypertrophy); Otitis Media with effusion (OME); on antibiotics in the past 7 days or on steroid therapy; suffering from any systemic disease, were excluded from the study.

Treatment plan & follow-up schedule

Patients with signs and symptoms of AOM were screened in General Paediatric clinic of the Institute.

Table 2 Demographic details of study patients

Demographic details	*Total patients* n *(%)*	*Mean ± SD*	*Homeopathy group* n *(%)*	*Conventional group* n *(%)*	p *value*
Medicine group					
Homeopathy	40 (50)	–	40 (50)	40 (50)	
Conventional	40 (50)				
Patients enrolled	81 (100)	–	40 (49.38)	41 (50.62)	
Patients followed up	80 (100)		40 (50)	40 (50)	
Sex					
Male	40 (50)	–	17 (42.5)	23 (57.5)	
Female	40 (50)		23 (57.5)	17 (42.5)	
Age group					
02 < 03 yrs	32 (40)	2.43 ± 0.46	17 (42.5)	15 (37.5)	0.435[a]
03 < 04 yrs	18 (22.5)	3.95 ± 0.12	06 (15)	12 (30)	
04 < 05 yrs	16 (20)	4.9 ± 0.17	07 (17.5)	09 (22.5)	
05 < 06 yrs	14 (17.5)	6 ± 0	10 (25)	04 (10)	
Duration of disease					
0–12 h	28 (35)	11.21 ± 1.77	14 (35)	14 (35)	0.745[a]
12–24 h	40 (50)	23.67 ± 0.99	21 (52.5)	19 (47.5)	
24–36 h	12 (50)	33.08 ± 3.36	5 (12.5)	7 (17.5)	
Intensity of disease					
Mild (01–07)	–	–	–	–	0.826[a]
Moderate (08–14)	41 (51.25)	12.39 ± 1.30	20 (50)	21 (52.51)	
Severe (15–20)	39 (48.75)	16.58 ± 1.09	20 (50)	19 (47.5)	

[a] Independent *t*-test $p > 0.05$ non-significant.

Tympanic Membrane Examination was conducted by the ENT specialist in all patients for confirming the diagnosis. Routine laboratory investigations of blood were done. After written informed consent patients were enrolled in study.

Interventions

As per the current guidelines in management of AOM, 'observation option' was adapted for first 3 days. Management was confined to symptomatic relief using analgesic, anti-inflammatory and antipyretics. After the assessment of this symptomatic treatment at 3rd day follow-up, if less than 50% improvement was observed as per AOM-SOS scale and Tympanic Membrane Examination scale antibiotics were prescribed.

Patients in Homeopathy group were prescribed appropriate homeopathic medicines in fifty millesimal (LM) potencies.

Selection of medicine

Detailed case taking of each patient was done and further information was obtained from his/her parents/guardians by the investigator, as per the guidelines laid down by Hahnemann in *Organon of Medicine*,[11] (§5 and §83 to §104) and *Kent's philosophy*.[12] Repertorization was done on the basis of totality of symptoms by using CARA software. After repertorization, medicine was selected on the basis of Homeopathic Materia Medica.[13]

Potency, dosage and repetition

Selected homeopathic medicine was started with 0/1 (LM potency) and followed by next higher potency in ascending manner as required were prescribed. Medicine was repeated 2−6 hourly depending upon the severity of patient's signs/symptoms.

Follow-up

In both the groups, patients were followed up in person on 3rd, 7th, 10th, and 21st day assessed with the AOM-SOS scale and Tympanic Membrane Examination scale. Follow-up of patient on 3rd day was assessed more carefully, as antibiotic treatment started after that visit. In Homeopathy group, all follow-ups were done as per the guidelines laid down for the second prescription in the protocol, i.e. increasing the potency and change of medicine

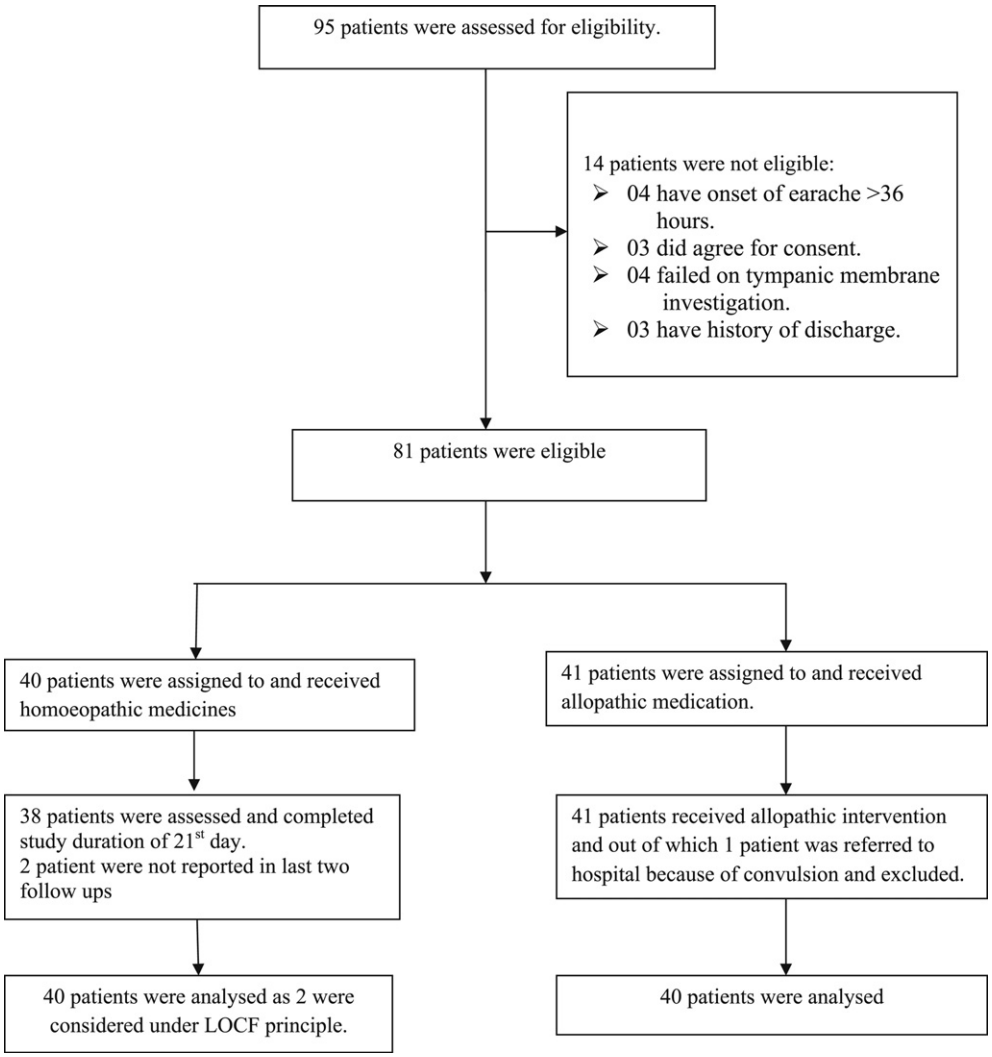

Figure 1 Flowchart of the study.

depending on the outcome of the first prescription. A maximum of two changes in prescription were permitted.

General non-medical advice given to the parents/guardian was: avoid putting baby down for a nap, or for the night, with a bottle; avoid exposing baby to cigarette smoke; wash hands frequently; don't allow sick children to spend time together, avoid putting foreign material into the ear; do not allow to get cold.[1]

Outcome assessment & statistical analysis

To assess the severity of disease, response of each patient was noted by the investigator and ENT Specialist as per the information gathered from parents/guardians on AOM-SOS scale and with the help of Tympanic Membrane Examination scale on 3rd, 7th, 10th and 21st day respectively. The patients were considered 'Cured' when the total scores (AOM-SOS + Tympanic Membrane Examination Scale) became zero, remaining patients were considered as 'Not cured'.

Analysis was performed on demographic data, symptom score and treatment outcome by the Mann−Whitney test, Independent '*t*' test and Chi-square test. Analysis was by Intention to Treat: missing data of patients withdrawn due to non-reporting, were replaced on the last observation carried forward (LOCF) principle. If the *p* value as reported was less than 0.05 it was declared as significant result and the null hypothesis was rejected.

Results

Patients

Out of 95 screened cases, 81 cases were found eligible for enrolment in this study. Mean age of the patients was 04 ± 02 years. The sex ratio was equal i.e. males 50% (n = 40) and females 50% (n = 40) (Table 2). In Conventional therapy group out of 41 patients, 40 patients completed the 21 days follow-up. 01 patient was referred to hospital because of convulsions and was excluded from the study.

In Homeopathy group, 02 patients did not report for last two follow-up, but were considered in analysis by applying LOCF principle (Figure 1).

Table 3 Changes in each symptom at entry and at end in both groups

A. Symptoms

Symptoms	Homeopathy group			Conventional group			*p* value
	No. of patients at entry/end	Mean ± SD of symptom score		No. of patients at entry/end	Mean ± SD symptom score		
		At entry	At end		At entry	At end	
Ear pain	40/2	1.25 ± 0.43	0.07 ± 0.34	40/0	1.32 ± 0.47	NA	0.155*
Tugging	39/1	1.3 ± 0.51	0.05 ± 0.31	39/0	1.32 ± 0.52	NA	0.317*
Crying	38/1	1.4 ± 0.59	0.05 ± 0.31	40/0	1.5 ± 0.50	NA	0.317*
Irritable	39/2	1.4 ± 0.59	0.07 ± 0.34	39/0	145 ± 0.55	NA	0.155*
Difficult to sleep	37/1	1.3 ± 0.60	0.05 ± 0.31	39/0	1.2 ± 0.56	NA	0.317*
Playful	40/2	1.3 ± 0.48	0.05 ± 0.22	38/0	1.2 ± 0.51	NA	0.155*
Eating less	39/1	1.22 ± 0.47	0.02 ± 0.15	40/0	1.2 ± 0.42	NA	0.317*
Fever	32/2	0.85 ± 0.48	0.07 ± 0.34	38/0	1.07 ± 0.41	NA	0.155*

B. Signs on Tympanic Membrane Examination

Investigation	Homeopathy group			Conventional group			*p* value
	No. of patients at entry/end	Mean ± SD of symptom score		No. of patients at entry/end	Mean ± SD of symptom score		
		At entry	At end		At entry	At end	
Colour at entry/end		1.20 ± 0.40	0.35 ± 0.48		1.21 ± 0.41	0.33 ± 0.47	0.155*
Pearly white	0/38			0/0			
Pinkish with increased vascularity	32/1			38/0			
Red	8/1			2/0			
Transparency at entry/end		1.00 ± 0.00	0.22 ± 0.42		1.012 ± 0.11	0.22 ± 0.42	0.317*
Translucent	0/39			0/0			
Haziness	40/1			39/0			
Cloudy opacified	0/0			1/0			
Mobility at entry/end		1.00 ± 0.00	0.15 ± 0.36		1.012 ± 0.11	0.16 ± 0.38	0.317*
Normal	0/39			0/40			
Restricted	40/1			39/0			
Decreased mobility	0/0			1/0			
Bulging at entry/end		1.00 ± 0.00	0.3 ± 0.46		1.012 ± 0.11	0.31 ± 0.47	0.155*
Normal	0/38			0/40			
Mild	40/2			39/0			
Severe	0/0			1/0			

*Mann−Whitney test $p > 0.05$ is non-significant.

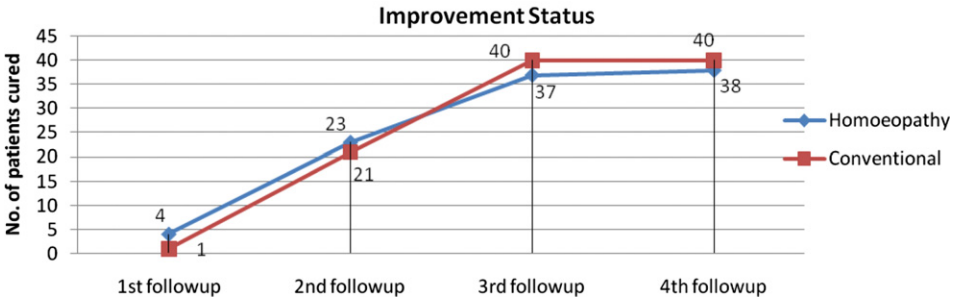

Figure 2 Improvement status in Homeopathy and Conventional groups.

Baseline characteristics

The symptoms of patients at entry in both the treatment groups after randomization were similar.

At the end of treatment in both the groups, the individual symptoms score had decreased markedly from its baseline score (Table 3). In the Conventional group, antibiotics were prescribed in 39 (97.5%) patients but were not required at all in Homeopathy group.

Treatment outcome

The patients were considered 'Cured' when the total scores (AOM-SOS + Tympanic Membrane Examination Scale) became zero.

In Homeopathy group, on 3rd, 7th, 10th and 21st day, 10% (n = 04), 47.5% (n = 19), 35% (n = 14) and 2.5% (n = 01) patients were cured. Overall cure was in (n = 38) 95% patients and the mean symptom score at baseline 14.28 ± 2.24 became 0.58 ± 2.82.

In Conventional group, on 3rd, 7th, 10th and 21st day, 2.5% (n = 1), 50% (n = 20), 47.5% (n = 19) and 0% (n =00) patients respectively got cured; all together patients cured were (n = 40) 100% and the mean symptom score at baseline 14.60 ± 2.61 became 0.00 ± 0.00.

Since all the patients were fully recovered after 21 days of treatment, it was of relevance to look at outcome differences within first 7 days. Figure 2 depicts the cumulative number of patients that experience their improvement at different follow-ups. Table 4 shows percentage of patients experiencing cure at first follow-up was significantly higher in Homeopathy group (n = 4) as compared to Conventional group (n = 1) (p = 0.000). Similarly on 7th day 23 patients were cured in Homeopathy and 21 patients in Conventional group (not statistically significant). There is no significant difference in the final treatment outcome between groups (p = 0.247 Fisher exact test) (Table 4).

Medication

In the Conventional treatment group, antibiotics prescribed were *Azithromycin* (17 patients), and Amoxicillin (22 patients). Initially all patients were treated with antipyretics, anti-inflammatory for first 3 days, but only 01 patient was cured. From 3rd day, antibiotics were prescribed in 39 patients and they all got cured at end of treatment (Table 5).

All together, 10 homeopathic medicines were used for treatment of 40 patients of AOM under Homeopathy group. The most useful medicines prescribed and found effective were − *Pulsatilla nigricans*, *Mercurius solubilis*, *Silicea*, *Chamomilla*, *Lycopodium clavatum* & *Sulphur.* These medicines were useful in treatment of (n = 36) 85% of patients. *Arsenicum album*, *Calcarea carbonica*, *Cina and Hepar sulphuratum* were prescribed to one patient each (Table 5).

Discussion

The outcome of study compares the effectiveness of Homeopathy and Conventional therapy in treating the AOM and shows they are equally beneficial. No patient in the Homeopathy group required antibiotics.[14]

The incidence of AOM was higher in younger children reveals (n = 32) 40% in age group 2−3 years, (n = 18) 22.5% in age group 3−4 years, (n = 16) 20% in age group 4−5 years and (n = 14) 17.5% aged 5−6 years.

Homeopathy is popular and one of the most used CAM for Otitis Media. Studies have shown positive role of homeopathic medicines in AOM.[14,15] In our study, symptomatic improvement was quicker in the Homeopathy group, and

Table 4 Symptoms score and improvement status during follow-ups

	Homeopathy group			*Conventional group*			p *value*
	Mean symptoms score ± SD	*Cured*	*Not cured*	*Mean symptoms score ± SD*	*Cured*	*Not cured*	
At entry	14.28 ± 2.24	0	0	14.60 ± 2.61	0	0	0.553
1st follow-up on 3rd day	8.18 ± 4.93	4	36	12.55 ± 4.32	1	39	0.000[a]
2nd follow-up on 7th day	1.45 ± 2.19	23	17	1.08 ± 1.30	21	19	0.356
3rd follow-up on 10th day	0.72 ± 3.05	37	3	0.00 ± 0.00	40	0	0.137
4th follow-up on 21st day	0.58 ± 2.82	38	2	0.00 ± 0.00	40	0	0.202

[a] Independent *t*-test $p < 0.05$ is significant.

Table 5 Useful medicines and improvement status

	Homeopathy group					*Conventional group*			
	No. of patients					*No. of patients*			
S. No.	*Name of the medicines*	*Prescribed to* n *(%)*	*Cured*	*Not cured*	p *value*	*Name of the medicines*	*Prescribed to*	*Cured*	*Not cured*
1	*Arsenicum album*	01 (2.5)	01	–	NA	• Analgesic	40	1	39
2	*Calcarea carbonica*	01 (2.5)	01	–	NA	• Anti-pyretic			
3	*Chamomilla*	04 (10)	04	–	0.001*	• Anti-inflammatory			
4	*Cina*	01 (2.5)	01		NA	Antibiotic: • *Azithromycin (17)* • *Amoxicillin (22)*	39	39	00
5	*Hepar sulphuratum*	01 (2.5)	01		NA	–	–	–	–
6	*Lycopodium clavatum*	03 (7.5)	03	–	0.009*	–	–	–	–
7	*Mercurius solubilis*	07 (17.5)	07	–	0.000*	–	–	–	–
8	*Pulsatilla nigricans*	14 (35)	13	01	0.000*	–	–	–	–
9	*Silicea*	06 (15)	06	–	0.000*	–	–	–	–
10	*Sulphur*	02 (5)	01	01	0.058**	–	–	–	–
Total		**40**	**38**	**02**		–	**40**	**40**	–

*Paired *t* test (symptoms score) $p < 0.05$ is significant. **$p > 0.05$ not significant.

there was a large difference in antibiotic requirements, favouring homeopathy. However, onset of improvement within the 3rd days after treatment was significantly faster in homeopathic treatment.

In present study medicines used were *Pulsatilla nigricans*, *Mercurius solubilis*, *Silicea*, *Chamomilla*, *Lycopodium clavatum and Sulphur* which is in line with the results of study done in past.[16]

In our study, in Conventional group 'observation option' for treatment failed; as 39 out of 40 patients are cured with antibiotics only after 3rd day follow-up. Whereas homeopathic medicines resulted in cure of 04 patients on 3rd day itself as compared to 01 patient under Conventional group, on 7th day, 23 & 21 patients were cured in Homeopathy and Conventional group respectively. In Homeopathy group antibiotics were not required for any case. This result augments the consideration that homeopathic medicines can reduce or avert use of antibiotic prescribing in AOM cases.

Use of antibiotics early in an episode of AOM may impair the natural immune response and weakens the protection against further episodes, as suggested in studies of bacterial pharingitis.[17,18] Another study concludes that recurrent Otitis Media occurred more often in children originally treated with amoxicillin (antibiotic).[19] Our study results showed conventional and homeopathy medicines are equally effective in treatment of AOM. Homeopathic medicines strengthen the immunity of patients; it does not have harmful effects like antibiotics.[5] These results will enhance the use of homeopathic medicines in paediatric population instead of antibiotics for AOM.

Conclusion

The study achieved the objective to compare the effectiveness of Homeopathy and Conventional therapy in AOM. The outcome shows that Homeopathy therapy does not lag behind the Conventional therapy in the treatment of AOM. The result also counters the myth that in acute conditions, homeopathy does not act fast. No antibiotic was required at all in dealing with the AOM patients under Homeopathic regimen. It supports the belief that individualized homeopathy is useful and that homeopathic medicines can reduce or avert use of antibiotic prescribing in AOM.

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References

1 National Institute of Deafness & other Communication Disorders. Ear infections in children; what causes ear infection: para - 01st, http://www.nidcd.nih.gov/health/hearing/ear%20infections
2 Corbeel Lucien. What is new in otitis media? *Eur J Pediatr* 2007; **166**: 511–519.
3 O'Neill Paddy. Clinical evidence – acute otitis media. *BMJ* 1999; **319**: 833 (Published 25 September 1999); [assessed on 01.09.10].
4 Davidson Hunter, John AA. *Principles and practice of medicine*. 19th edn. Philadelphia: Churchill Livingston, 2002, p. 566.
5 Noverr MC, Noggle RM, Toews GB, Huffnagle GB. Role of antibiotics and fungal microbiota in driving pulmonary allergic responses. *Infect Immun* 2004; **72**: 4996–5003.
6 Biswas AC, Joarder AH, Siddique BH. Prevalence of CSOM among rural school going children. *Mymensingh Med J* 2005 Jul; **14**(2): 152–155.
7 Harrison H, Fixsen A, Vickers A. A randomized comparison of homoeopathic and standard care for the treatment of glue ear in children. *Complement Ther Med* 1999 Sep; **7**(3): 132–135.
8 Witco David. *CARA Professional*. London: Miccant Ltd, 1997. Revised Programme by John Stevenson 1999.

9 American academy of pediatrics and American academy of family physicians. Diagnosis and management of acute otitis media. *Pediatrics* May 2004; **113**(No.5).

10 Shaikh N, Hoberman A, Paradise JL, *et al*. Development and preliminary evaluation of a parent-report outcome instrument for clinical trials in acute otitis media. *Pediatr Infect Dis J* 2009; **28**: 5−12.

11 Hahnemann S. *Organon of medicine*. Reprint 5th & 6th edn. New Delhi: B. Jain Publishers (P) Ltd., 1994.

12 Kent JT. *Lectures on homoeopathic philosophy.* Reprint 4th edn. New Delhi: B. Jain Publishers (P) Ltd., 1997.

13 Boericke W. *New manual of homoeopathic Materia Medica and repertory with relationship of remedies*. New Delhi: B. Jain Publishers Pvt. Ltd., 1998. First Corrected, Revised and updated Edition.

14 Jacobs J, Springer DA. Homoeopathic treatment of acute otitis media in children: a preliminary randomized placebo-controlled trial. *Pediatr Infect Dis J* 2001; **20**: 177−183.

15 Barnett ED. Challenges of evaluating homoeopathic treatment of acute otitis media. *Pediatr Infect Dis J* 2000; **19**: 271−275.

16 Friese KH, Kruse S, Ludtke R, Moeller H. The homoeopathic treatment of otitis media in children - comparisons with conventional therapy. *Int J Clin Pharmacol Ther* 1997 Jul; **35**(7): 296−301.

17 Frei H, Thurneysen A. Homeopathy in acute otitis media in children: treatment effect or spontaneous resolution? *Br Hom J* 2001; **90**: 180−182.

18 Pichichero ME, Casey JR. Systematic review of factors contributing to penicillin treatment failure in *Streptococcus pyogenes* pharyngitis. *Otolaryngol Head Neck Surg* 2007; **137**: 851−857.

19 Natalia B, Roger AMJ, Arno W Hoes, Anne GM, Maroeska MR. Recurrence up to 3.5 years after antibiotic treatment of acute otitis media in very young Dutch children: survey of trial participants. *BMJ* 2009; **338**: b2525. http://www.bmj.com/content/338/bmj.b2525.full?view=long&pmid=19567910.