External otitis – Burow's solution returns to favour

The treatment of external otitis today is predominantly antibiotic drops in combination with steroids. In the struggle to prevent unnecessary use of antibiotics we should perhaps also be more stringent about topical ear treatments and to a greater extent use older tried and tested preparations, such as Burow's solution. As Burow's solution is now available as an over-the-counter ear spray, the therapy and prophylactic treatment of people known to be prone to the problem can be initiated early.

COMMON PROBLEM

External otitis is a common problem. In a survey carried out in the United Kingdom in 2001 the annual prevalence was determined to be 1.2 – 1.3 percent [1]. Swimmers, bathers, divers, athletes who shower frequently and others who have frequent contact with water can suffer from external otitis. For that reason it is also known as swimmer's ear. Different types of eczema can cause external otitis, but so can excessive cleaning, hearing aids, headphones, in-ear headphones, earplugs etc.

With increased travel to warm and humid climates, often involving a lot of contact with water, there is a concomitant increase in the frequency of external otitis and days of vacation spoiled [2]. Even during the Swedish summer external otitis is more common than during the rest of the year, which is also reflected by the number of visits to a doctor due to this problem. It is estimated that more than 100 000 Swedes annually suffer from inflammation in the outer ear and auditory canal.

The treatment of external otitis is currently primarily manual cleaning, followed by treatment using an astringent solution and/or topical treatment with ear drops containing steroids and antibiotics.

BUROW'S SOLUTION

As early as the mid-19th century Karl August Burow showed that mixing lead acetate and alum in water gave rise to a solution of aluminium acetate. Burow used copious amounts of the solution to,

among other things, treat wounds that were left open to heal. For many years Burow's solution was commonly used to treat insect bites, various skin lesions and ear canal inflammation. With the antibiotic breakthroughs of the mid-20th century the use of Burow's solution to a great extent ceased.

Now there is a preparation based on Burow's recipe that is once again available internationally. In Sweden it has been on sale since 2011 as Otinova® ear spray, a medical technology product with the treatment of external otitis as its indication for use.

ANTIMICROBIAL EFFECT

A number of studies have demonstrated an antimicrobial effect for Burow's solution [4- 9]. Laboratory strains, among others, of Pseudomonas aeruginosa and Staphylococcus aureus, as well as cultures isolated from patients of the same bacterial strains and even fungal strains, such as Candida albicans and Aspergillus, have been found to be sensitive to the antimicrobial effects of Burow's solution. Bacteriostatic effects have been demonstrated for solutions as dilute as 1:160 [6]. Thorp et al [5] were able to show that the aluminium acetate is the important component responsible for this effect, although the low pH augments the antibacterial effect.

CLINICAL EFFECT

A number of studies have demonstrated that Burow's solution is both safe and effective for the treatment of external otitis. The US Navy observed at an early stage a high frequency of external otitis in saturation divers, due to the high temperatures and humidity in pressure chambers. In 1974 Thalmann [10] carried out a study where it was possible to completely eliminate external otitis in 26 saturation divers by administering Burow's solution as a prophylactic treatment for five minutes daily. The experimental dives that were carried out over a minimum period of ten days were performed in a chamber system under constant and strict monitoring to rule out non-compliance.

In a study of English military personnel on Cyprus 117 cases of external otitis were treated using either polymyxin + neomycin + hydrocortisone (Otosporin) or aluminium acetate drops [11] and 108 patients experienced a complete return to normal. For 59 patients the time taken for them to become completely symptom-free was recorded, which was 9.36 days for aluminium acetate and 11.06 days for Otosporin. The authors concluded that aluminium acetate is effective, cheap and safe and put forward the opinion that antibiotics/steroid drops should only be used for severe cases of external otitis.

Clayton et al [12] demonstrated in a study involving 102 ears with otorrhoea that 68% of those treated with 0.3% gentamicin sulfate and 67% of those treated with 8% aluminium acetate showed significant improvement measured as a clinical score (>2 on a scale of 0-4). In other words, there were no differences between the treatment groups. Gentamicin-resistant organisms were also detected in the gentamicin group. The authors recommended the use of a topical antiseptic solution of aluminium acetate rather than antibiotic solutions for the initial treatment of otorrhoea.

In a further study 50 ears with chronic otorrhoea (48 patients) were treated using Burow's solution [7]. Of these 50 ears, 45 became symptom-free or improved after treatment with Burow's solution without any significant

side effects. The authors summarised that Burow's solution is an effective otological solution.

Finally, in a smaller study of 14 ears (12 patients) with refractory otorrhoea of different underlying origins the disease was cured after 1–17 weeks of treatment with Burow's solution (average time 5.4 weeks) [8]. The authors concluded that Burow's solution is an effective treatment for refractory otorrhoea.

In several of the studies cited above treatment with Burow's solution has been able to clear up infections involving antibiotic-resistant bacteria. In a German literature review [13] the conclusion of the authors was to recommend Burow's solution and similar preparations for the treatment of methicillin-resistant Staphylococcus aureus (MRSA) ear infections.

Our own experience of Burow's solution in clinical practice is partially limited by the short time that Burow's solution (Otinova®) has been on the market. In the cases where we have used the product, both we and the patients have been very pleased with the results.

SAFETY

In the clinical studies that have been carried out no side effects apart from a stinging sensation have been reported. No ototoxicity could be identified in an experimental guinea pig study [14]. However a limited amount of ototoxicity has been reported for direct injection into the middle ear. Two cases of reversible hearing loss in patients were reported by Oishi et al [15] and some ototoxicity was reported in a study using guinea pigs by Suzuki et al [16]. For these reasons it should be ascertained that the ear drum is intact before applying Burow's solution.

SUMMARY

We can conclude that external otitis is a common problem that GPs often see in their daily work. Manual cleaning and steroid/antibiotic drops are the contemporary treatments in use today. Burow's solution has been demonstrated in several studies to be both effective and safe as a prophylactic and for the treatment of external otitis. This fact should be taken into consideration in light of the increasing resistance to antibiotics in society. Burow's solution as an alternative first-line treatment should therefore be considered.

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Karl August Burow (1809–1874) was a professor 1844 – 1859, who was subsequently appointed to the position of Municipal Health Commissioner and then Surgeon General 1866 – 1870. Burow strongly advocated that all major wounds should be left open to heal and not sutured, which was the usual method used in the era of Burow. His reasoning was based on observing that animals with wounds that were left open usually exhibited good wound healing, while human wounds that had either been heavily bandaged or sutured were often prone to severe infections. This was a revolutionary concept in an era when Lister used carbolic acid to combat all of the elements in the air that could potentially give rise to spoilage. Burow created a solution of lead acetate and alum in water. This resulted in a water-based solution of aluminium acetate where the lead sedimented out and could be removed by filtration. Burow used copious amounts of the solution for the treatment of wounds that were left open to heal. Often Burow would drop the solution onto a thin compress placed over the wound.

Translated from: Örnhagen H, Lundberg C, Sandelin O. Extern otit – Burows lösning åter till heders. AllmänMedicin 2013, 2, 40-1.