Auricular acupuncture: Achieving positive outcomes in primary school children with atopic asthma

Research question

Does auricular acupuncture have an impact on the clinical outcomes of primary school aged children with atopic asthma?

Aim

The aim of this public health program is to determine the effect of stimulating auricular acupuncture points — using small, stainless steel spheres — on the clinical outcomes of primary school children clinically diagnosed with atopic asthma.

Objectives

1. To determine whether the stimulation of the auricular acupuncture points Lung 1, Shen Men, Antihistamine and Asthma has an effect on the lung function of primary school aged children clinically diagnosed with atopic asthma, using the Peak Expiratory Flow measure.

2. To determine whether the stimulation of the auricular acupuncture points Lung 1, Shen Men, Antihistamine and Asthma has an effect on the quality of life for primary school aged children clinically diagnosed with atopic asthma, using the Paediatric Asthma Quality of Life Questionnaire.

3. To determine whether the stimulation of the auricular acupuncture points Lung 1, Shen Men, Antihistamine and Asthma in addition to conventional biomedical treatment is more successful than conventional biomedical treatment alone in enhancing lung function and improving quality of life for primary school aged children clinically diagnosed with atopic asthma.

4. To give primary school aged children clinically diagnosed with atopic asthma additional opportunity to manage their own asthma treatments.

5. To give primary school teachers an additional tool to reengage in learning and physical activities those students clinically diagnosed with atopic asthma.

Background

Asthma is an obstructive airways disease marked by airflow limitation, airway hyperresponsiveness and inflammation of the bronchi (Kumar & Clark 2006, p 912). Characteristic signs include wheezing or persistent dry cough particularly at night, early morning or with exercise; chest tightness; and dyspnoea (Haslett et al 2003, p 289).

There are two types of asthma: extrinsic (allergic/atopic) and intrinsic (non-allergic). Extrinsic asthma is more common, affecting two-thirds of asthmatics (Le Souf 2002, S40-S41). More than 90 per cent of children suffer from this form of asthma (Kumar & Clark 2006, p 912). Non-allergic asthma affects one-third. The reason asthma develops for one individual and not another is poorly understood. Asthma can be multifaceted with genetic, IgE antibody and environmental factors contributing to its aetiology (Le Souf, S40-S41).

There is no single diagnostic test for asthma. Identification of symptoms with improved peak flow readings following inhaled medication is diagnostically significant and allergy tests can be significant (Kumar & Clark, p 917).

Maintaining peak flow charts night and morning can illustrate the variable airflow that is a feature of asthma (Kumar & Clark, pp 217-218). Measuring quality of life for paediatric asthma sufferers can be troublesome due to the young age of respondents and such related issues as a lack of ability to read. To overcome this problem, the Australian Centre for Asthma Monitoring (Australian Centre for Asthma Monitoring 2004, pp Xv and 36), recommends using the Paediatric Asthma Quality of life Questionnaire, namely because it caters for a wide childhood age bracket and can be administered by interview. Also, children aged 7 years and more can complete the questionnaire themselves. The key components of this questionnaire are outlined in Appendix 1.

Australia has one of the highest prevalence rates of asthma in the world (Australian Centre for Asthma Monitoring, pp 9-10), as confirmed by Burney et al′s comparison of adulthood asthma (1996, p 687 to 695) and Asher et al′s comparison of childhood asthma (1995, p 483 to 491). In Australia, more than 2 million people are affected by this condition, the age breakdown of which is highlighted in table 1. This equates to almost 1 in four children, 1 in 7 adolescents and 1 in 10 adults (Queensland Health 2001, p 6).

Table 1: Prevalence of asthma, 2004-05 <table cannot be pasted into this online form>

To help combat the problem, the National Asthma Action Plan was developed. The plan identifies a range of population groups as having special asthma needs because of higher prevalence rates or factors that complicate the management of this condition. These groups include children, adolescents, older Australians, Indigenous Australians, people of lower socio-economic status, and people in rural and remote areas (Queensland Health 2004, online). The National Asthma Strategy (National Asthma Council of Australia, 2006) aims to achieve specific outcomes in the management of asthma, nationwide. These include Outcome 4: increasing the capacity of people with asthma and their carers to take charge of their own asthma management (p 2) and Outcome 8: increasing school, childcare, workplace and aged car facility-based asthma management programs (p 3).

Asthma is the most common chronic illness in children. They accounted for one half of all asthma-related hospitalisations (more than 16,000) in Australia in 2004 to 2005 (Australian Institute of Health and Welfare 2006 in Australian Bureau of Statistics 2006, online). Compared with all age groups, children aged 0 to 4 years have the highest rate of hospital emergency department visits for asthma (Australian Institute of Health and Welfare, in Australian Bureau of Statistics 2006, online).

The economic impact of asthma is high. In 2000-2001, health expenditure on asthma totalled $693 million: 1.4 per cent of the total health expenditure in Australia in that year (Australian Institute of Health and Welfare 2005, in Australian Bureau of Statistics 2006, online). Children have the highest

proportion spent on asthma as outlined in Table 3. Nearly half of all hospital expenditure for asthma was for children aged 0 to 14 years. Nearly one quarter of all expenditure on hospital care, out-of-hospital care and pharmaceuticals was for 0 to 14 year old children (Australian Centre for Asthma Monitoring 2005, p Xi).

Table 3: Annual expenditure per capita by age group and sex, Australia, 2000 to 2001 <table cannot be pasted into this online form>
Source: Australian Centre for Asthma Monitoring 2005, p 9

People with asthma suffer a variety of health issues other than diminished lung function. Children in particular are more prone to behavioural problems (Bussing et al 1995, pp 565 to 572) and lower self-esteem, self-pity and occasionally embarrassment in taking medication (Donnelly 1994, pp 398 to 408). Studies in the UK indicate that children with asthma were restricted in their participation of everyday activities and frequently had school absences (Lenney et al, 1994, pp 49 to 62). A study in Australia indicates that participation in sports and play activities suffer (Sawyer & Fardy 2003, pp 131 to 138).

Pharmaceuticals appear to be the current treatment of choice. Almost 54 per cent of Australian health expenditure on asthma in 2000-2001 was for pharmaceuticals. It is interesting to note this was significantly more than the proportion of the total health expenditure on pharmaceuticals in the same period (Australian Centre for Asthma Monitoring 2005, p Xi).

This prevalent reliance on pharmaceuticals to manage asthma is concerning. A key preventer for asthma is the corticosteroid. The use of corticosteroids in infancy has been reported to impair lung growth and enhance the development of the TH2 immune response (Van Asperen 2002, p S64). Anderson (2002, p S47) indicates T cell immune suppressors at this time are too toxic to use in very young children.

While medication makes a difference to the lives of asthma sufferers, adverse effects and difficulties in administering the medications have been noted. For example, research by Goeman & Douglas (2005, pp S26 and S27) indicates that B2 agonists (a range of popular pharmaceuticals to treat asthma) increase the severity of tremors, anxiety and palpitations in elderly people. Macicocia (2008, p 114) adds that B2 antagonists increase the chances of cardiac dysrhythmia. Meanwhile, corticosteroids have been shown to contribute to osteoporosis (Goeman & Douglas 2005, pp S26 and S27).

Goeman & Douglas' research confirms historical facts. The adoption of B2 agonists in New Zealand to treat asthma resulted in a fourfold increase in the asthma mortality rate during the 1980s. In the UK in the 1960s, there was an increase in the number of deaths from asthma correlating with the introduction of pressurised aerosols to relieve wheezing (Upton et al 2000, in Maciocia, p114). As Maciocia states, 'As sales went up, so did the deaths' (p

114). Many researchers believe the use of some antihistamine drugs in the long-term are detrimental and may be contributing to an increase in the mortality rate from the disease (Maciocia, p 114).

Auricular acupuncture is used in traditional Chinese medical circles to treat asthma (Rubach 2001, p 148). A well-regarded auricular acupuncture treatment protocol involves stimulation of the auricular points Lung 1, Shen Men, Antihistamine and Asthma (Oleson 2003, pp 300 and 301). An ear map of these points is located in Appendix 2. While there have been a number of clinical trials on the effectiveness of this form of acupuncture in treating cocaine dependency (Gates et al 2006: online), pain relief (Alimi et al 2003: online) and weight loss (Shiraishi et al 2003: online), there have been no clinical trials into its effectiveness in managing asthma.

Rationale for the program

Currently, pharmaceuticals are the most popular asthma intervention. Despite the side effects of pharmaceuticals, new drugs are constantly being developed to treat this condition. And despite these new drugs, asthma is still the most debilitating medical condition in childhood. It is clear that pharmaceuticals are not the answer. Auricular acupuncture is a safe alternative.

Auricular acupuncture need not involve the insertion of needles. Therapeutic results can be obtained with the use of small, stainless steel balls adhered onto small squares of surgical tape (prefabricated, called 'ear seeds') and placed on auricular acupuncture points. Therefore, only elementary training is needed to equip a responsible adult such as a teacher or school-based nurse with the skill to located auricular acupuncture points and attach the ear seeds. This means auricular acupuncture can become a key component of any school-based asthma management program and so, contributes to achieving Outcome 8 of the National Asthma Strategy: increasing school, childcare, workplace and aged car facility-based asthma management programs. Additionally, because patients with ear seeds stimulate the auricular acupuncture points themselves (by pressing or rubbing their ear seeds), an auricular acupuncture public health program aligns with Outcome 4 of the National Asthma Strategy: increasing the capacity of people with asthma and their carers to take charge of their own asthma management.

Because there are no clinical trials into the effectiveness of auricular acupuncture in reducing the effects of asthma, this program is a pilot study. Its results may firm the case for a major public health program involving more children.

Study design

It is proposed that a pilot study be conducted using auricular acupuncture in the treatment of children 7 years of age and more suffering from clinically

stable atopic asthma. This minimum age has been set due to the inability of children aged under 7 years to complete the Paediatric Asthma Quality of Life Questionnaire by themselves.

Teachers and school nurses (if available) will administer the treatment. Training afternoons will be held at each school, where auricular acupuncture will be showcased and demonstrated, and the pilot study outlined. The training afternoons will be interactive, enabling teachers and school nurses to ask questions and practice locating auricular acupoints. Written information on the study including an ear map showcasing the location of the auricular acupoints (see Appendix 2) will be handed out.

Information sessions for parents and caregivers will be held so they can find out more about the study and auricular acupuncture. Written information for parents/caregivers will be provided.

Baseline measurements will be obtained when participants are enrolled, namely:
• peak expiratory flow readings, using peak flow meters
• quality of life, using the Paediatric Asthma Quality of Life Questionnaire.

Following this, auricular acupuncture will be administered by teachers and school nurses (where available), involving ear seeds placed onto the auricular acupoints Lung 1, Shen Men, Antihistamine and Asthma. Ear seeds will be replaced once a week, using the same auricular acupoints. The duration of treatment will be 20 weeks.

Patients or their parents/caregivers (depending on age) will administer the treatments each day by pressing or rubbing the ear seeds. They will be encouraged to do same whenever they feel an asthma attack is coming on. Patients or their parents/caregivers (depending on age) will keep a diary of any supplementation. Measurements will be taken every week.

Participants

About 20 participants will be drawn from three primary schools. Schools will work with parents/caregivers to identify participants.

Parents and caregivers will be provided with verbal (via seminars) and written (via letters) information about the study.

Eligibility will be based on the following:
• all participants have clinically stable atopic asthma – as confirmed my medical practitioners
• no discrimination between male and female participants
• all participants of at least 7 years of age.

The participants and their parents/caregivers will need to provide informed consent before joining the study.

Participants will continue to receive conventional asthma treatment during the course of the study.

Variables

Outcomes will be measured on enrolment (at baseline) and at weekly intervals during the course of the study (20 measurements in total).

The primary outcome variable will be peak expiratory flow readings using peak flow meters. Participants will measure maximum rate at which they can blow air into their peak flow meter. This will suggest the level of dilation of their airways (that is, airflow obstruction).

Quality of life will be ascertained using the Paediatric Asthma Quality of Life Questionnaire. This is an asthma-specific quality of life measure specifically designed to assess the impact of asthma on children. It contains 23 items and takes only 10 minutes to complete. It measures the psychological, physical and social health of children in terms of symptoms, activity limitation and emotions. The score ranges from 0 to 100, with the higher scores indicating better health.

Data collection

When participants are enrolled, a trained clinician and a trained interviewer will collect baseline data. The trained clinician will measure participants' peak flow readings every day for one week. The best scores will be used as the baseline measures. The trained interviewer will conduct the initial quality of life assessment.

Following this, each participant will be provided with their own peak flow meter (which are portable and inexpensive). Because children aged 7 and over can learn how to successfully use peak flow meters (National Asthma Council of Australia, pp Xv and 36), they will be encouraged to record their own readings every week. Teachers will be requested to forward these readings to the author each week.

Quality of life will be measured at conclusion (week 20) by participants, using the child-friendly Paediatric Asthma Quality of Life Questionnaire.

Ethical concerns

Permission to undertake this study will be sought from relevant ethics and safety committees.

Informed consent will be sought from all participants and their parents/ caregivers.

Written explanations of the study will be provided to teachers, school nurses,

participants and parents/caregivers to supplement verbal communication.

All communication (written and verbal) will inform participants and their legal guardians about the purpose of the study, the upholding of participant privacy and possible side effects of treatment. The stainless steel balls used in this study will not penetrate the skin. Therefore, there is minimal risk of pain and infection.

Additionally, participants will continue to receive their current conventional asthma treatments during the study, in accordance with the Declaration of Helsinki (World Medical Association 2004).

Timeline

The study will begin on the 14 January 2009. As outlined in Table 4, for the first month, preparations will take place including collating written communication materials and formulating the agenda for seminars.

In the second month, seminars and information sessions will be held. Participants will be recruited.

In the third month, baseline measurements will be recorded. Interventions will begin one week after baseline measurements are gained. Interventions and data collation will continue until the 20th week, when the study will conclude.

Table 4: Timeline for the pilot study <table cannot be pasted into this online form>

References

Alimi D, Rubino C, Pichard-Léandri E, Fermand-Brulé S, Dubreuil-Lemaire M, Hill C, 2003, 'Analgesic Effect of Auricular Acupuncture for Cancer Pain: A Randomized, Blinded, Controlled Trial', Journal of Clinical Oncology, Vol 21, Issue 22, 4120-4126, accessed 28 April 2008: http://jco.ascopubs.org/cgi/content/full/21/22/4120

Anderson G, 2002, 'The Immunobiology of Early Asthma', Medical Journal of Australia, Vol 177.

Asher I, Kiel U, Anderson HR, Beasley R, Crane J, Martinez F et al, 1995, 'International Study of Asthma and Allergies in Childhood (ISAAC): rationale and methods', European Respiratory Journal, Ed 8.

Australian Bureau of Statistics, 2006, Asthma in Australia: snapshot 2004 to 2005, Australian Bureau of Statistics, accessed 28 April 2008: www.abs.gov.au/ausstats/abs@.nsf/mf/4819.0.55.001

Australian Centre for Asthma Monitoring, 2004, Measuring the impact of asthma on quality of life in the Australian population, Australian Institute of Health and Welfare, Canberra.

Australian Centre for Asthma Monitoring, 2005, Health care expenditure and the burden of disease due to asthma in Australia, Australian Institute of Health and Welfare, Canberra.

Burney P, Chinn S, Jarvis D, Luczynska C & Lai E, 1996, 'Variations in the prevalence of respiratory symptoms, self-reported asthma attacks, and use of asthma medication in the European Community Respiratory Health Survey', European Respiratory Journal, 9 (Suppl. 9).

Bussing R, Halfon N, Benjamin B, Wells KB, 1995, 'Prevalence of behavioural problems in US children with asthma', Archives of Pediatric Adolescent Medicine, Edition 149.

Donnelly E, 1994, 'Parents of children with asthma: an examination of family hardiness, family stressors, and family functioning', Journal of Pediatric Nursing, Edition 9.

Kumar P, Clark M, 2006, Clinical Medicine, Elsevier Sanders, Spain.

Gates S, Smith L, Foxcroft D, 2006, 'Auricular acupuncture for cocaine dependence', Cochrane Database of Systematic Reviews, accessed 28 April 2008: www.cochrane.org/reviews/en/ab005192.htm

Goeman D, Douglass J, 2005, 'Understanding Asthma in Older Australians: a qualitative approach', Medical Journal of Australia, Edition 183, Suppl. 1.

Haslett C, Chilvers E, Boon N, Colledge N, 2002, Davidson's Principles and Practice of Medicine, Churchill Livingstone, Edinburgh.

Lenney W, Wells N, O'Neill B, 1994, 'The burden of paediatric asthma', European Respiratory Journal, Edition 4, Issue 18.

Le Souef P, 2002, 'Risk Factors and Epidemiology', Medical Journal of Australia, vol 177, S40-S41.

Maciocia G, 2008, The Practice of Chinese Medicine: The Treatment of Diseases with Acupuncture and Chinese Herbs, Churchill Livingstone, Europe.

National Asthma Council of Australia, 2006, National Asthma Strategy 2006 to 2008, Australian Health Ministers Conference 2006, Canberra.

Sawyer S, Fardy H, 2003, 'Bridging the gap between doctors' and patients' expectations of asthma management', Journal of Asthma, Edition 40, Issue 2.

Shiraishi T, Onoe M, Kojima T, Kageyama T, Sawatsugawa S, Sakurai K,

Yoshimatsu H, Sakata T, 2003, 'Effects of Bilateral Auricular Acupuncture Stimulation on Body Weight in Healthy Volunteers and Mildly Obese Patients', Experimental Biology and Medicine, 228:1201-1207, accessed 28 April 2008: www.ebmonline.org/cgi/content/abstract/228/10/1201

Queensland Health, 2001, The Health Outcomes Plan: Asthma 2001 to 2006, Queensland Government, Brisbane.

Queensland Health, 2004, High Risk and Indicated Groups, Queensland Government, accessed 28 April 2008: www.health.qld.gov.au/hop/asthma/asthma_risk.asp

Van Asperen P, 2002, 'Current Drug Therapies: relievers and preventers', Medical Journal of Australia, Vol 177.

World Medical Association, 2004, 1/10/08'Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects', World Medical Association General Assembly 2004, World Medical Association: Tokyo.

Appendix 1: Paediatric Asthma Quality of Life Questionnaire – Key Components <graphic cannot be pasted into this online form>

Appendix 2: Ear maps for auricular acupuncture treatment <graphic cannot be pasted into this online form>

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