

Acupuncture for Treatment of Acute Vomiting in Children with Gastroenteritis and Pneumonia

Akupunktur zur Therapie von Erbrechen im Kindesalter im Rahmen von Gastroenteritis und Pneumonie

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- acupuncture
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Schlüsselwörter

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Bibliography

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Abstract

Objective: Acupuncture is successfully used to alleviate vomiting in children after general anesthesia. However there is no data on treatment of vomiting in children with gastroenteritis (GE) and pneumonia (PM).

Methods: Descriptive analysis of 18 cases, where acupuncture was used as an individual therapy attempt to treat vomiting in children with GE or PM before starting the conventional antiemetic therapy. Feasibility and acceptance by patients and parents as well as the incidence of vomiting and use of antiemetic drugs after acupuncture were recorded.

Results: Acupuncture was feasible in all children and application of the indwelling needles was tolerated without fear. Side effects were not observed. 13 patients stopped vomiting immediately after the insertion of acupuncture needles, none of the patients required conventional antiemetic medication.

Conclusion: Acupuncture for the treatment of vomiting is feasible and acceptable. Suggested antiemetic effect should be examined in a randomized multicenter controlled trial.

Zusammenfassung

Hintergrund: Akupunktur wird bereits erfolgreich eingesetzt, um bei Kindern das Auftreten von Übelkeit und Erbrechen nach Allgemeinanästhesie zu verhindern. Es existieren jedoch noch keine Daten zur Behandlung von Erbrechen im Rahmen von Gastroenteritis (GE) und Pneumonie (PM).

Methoden: Deskriptive Analyse von 18 Fällen, in welchen Akupunktur als individueller Therapieversuch bei Kindern mit GE oder PM eingesetzt wurde, bevor eine konventionelle antiemetische Therapie begonnen wurde. Durchführbarkeit und Akzeptanz der Akupunkturtherapie, Inzidenz von Erbrechen und Einsatz von Antiemetika wurden erhoben.

Ergebnisse: Akupunktur konnte bei allen Kindern angewendet werden, und die Applikation der Akupunkturpflaster wurde von den Kindern angstfrei toleriert. Es wurden keine Nebenwirkungen beobachtet. Bei 13 Patienten sistierte das Erbrechen mit dem Beginn der Akupunkturbehandlung, und keiner der Patienten benötigte Antiemetika.

Zusammenfassung: Akupunktur scheint bei Erbrechen effektiv zu sein und wird von Kindern gut angenommen. Der vermutete antiemetische Effekt sollte im Rahmen einer randomisierten, kontrollierten Multicenterstudie untersucht werden.

Introduction

Acupuncture is a traditional Chinese treatment method using needle insertion at distinct sites of the body surface. It became one of the most frequently applied methods of complementary and alternative medicine (CAM) in countries of the western world for a large spectrum of clinical conditions [16]. In this respect, the use of acupuncture in prevention and treatment of nausea and vomiting (N&V) after general anesthesia,

during chemotherapy and pregnancy has been evaluated and was found effective when applied to the acupuncture point P6 (● Fig. 1) [6, 11, 14]. P6 stimulation for prevention of postoperative N&V was described as effective as conventional antiemetic drugs including metoclopramide, ondansetron and dexamethasone [13]. In the treatment of the incidence and severity of nausea, the stimulation of P6 was superior to serotonin (5-HT₃) –receptor antagonist ondansetron: the incidence of nausea in the P6 group was 19%

compared to 40% in the ondansetron group and 79% in the placebo group [8]. The use of acupuncture against postoperative N&V at the P6 location was also evaluated in pediatric patients and it was found as effective as in adults [4, 14]. So far, the antiemetic properties of P6 stimulation in pediatric patients were only used for N&V prevention in the perioperative setting and its treatment during chemotherapy [4, 10], although acupuncture is a safe treatment modality for children [12]. There are no trials evaluating acupuncture for treatment of N&V in the context of common infectious pediatric diseases such as gastroenteritis and pneumonia. In these conditions, vomiting is one of the key symptoms accounting for reduced oral fluid intake and therefore requiring hospitalization [5,9]. Based on these considerations, we analyzed feasibility and acceptance of acupuncture used as an individual therapy attempt to treat vomiting in children with acute gastroenteritis and pneumonia and collected preliminary outcome data in order to prepare for a controlled randomized trial.

Methods

Descriptive analysis of clinical records

The clinical records of children who received acupuncture as individual therapy attempt to treat acute vomiting between November 2008 and February 2009 at the Department of Pediatrics of the Ernst-Moritz-Arndt University Greifswald were studied. The parents of the children, who were admitted to the hospital because of acute vomiting, were all asked if they wanted to try antiemetic acupuncture in addition to standard therapy. We did not offer acupuncture to children who revealed hemodynamic instability, clinical symptoms of severe dehydration or who revealed symptoms of increased intracranial pressure upon admission. The parents of all children agreed to have acupuncture performed on their children and signed the informed consent.

Application of acupuncture

Fixed indwelling "NEW PYONEX" auricular acupuncture needles (AA) from Seirin, Japan, with a diameter of 0.22 mm and a length of 1.5 mm (○ Fig. 1) were applied by a pediatrician licensed for acupuncture before beginning the conventional antiemetic therapy. Needles were applied uni- or bilaterally depending on the placement of iv-lines to acupuncture point P6 (Pericardium 6, Neiguan). P6 is located twice the width of an individual's thumb proximal to the distal wrist crease, between the tendons of the M. palmaris longus and M. flexor carpi radialis (○ Fig. 2). The needles were fixed with skin-colored adhesive tape and patients, parents and nurses were instructed how to stimulate the needles in case of nausea and vomiting. The children were told that they will receive "a sticker", which is going to relieve their complaints and the child was shown the needle immediately before its application (○ Fig. 3).

Indwelling needles were left in situ for about 2–3 days and patients, parents and nurses were encouraged to perform needle stimulation by the means of massage for 2–3 min in the case of N&V.

Outcome analysis

Acceptance of acupuncture and subjective experience with this therapy was analyzed using an interview at the end of each individual therapy attempt. The data on the incidence of nausea and vomiting and the frequency of the use of antiemetic medication were extracted from patient's chart and presented in a descriptive manner using median and range where appropriate. The



Fig. 1 Fixed indwelling acupuncture needle. The indwelling auricular acupuncture needle (AA) from Seirin "NEW PYONEX" auricular Japan was used. The needle has a diameter of 0.22 mm and a length of 1.5 mm.

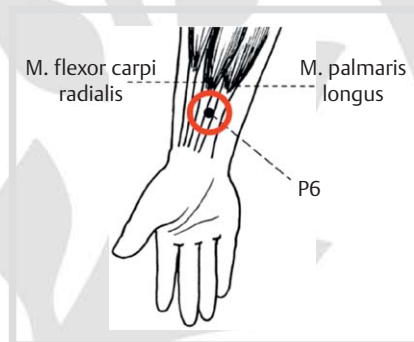


Fig. 2 Schematic location of stimulation point Pericardium 6 (P6). P6 (Neiguan) is located between the tendons of the M. palmaris longus and M. flexor carpi radialis twice the width of an individual's thumb proximal to the distal wrist crease.



Fig. 3 Illustration of the indwelling acupuncture needle in situ. The indwelling acupuncture needle is illustrated in relation to a penny (diameter: 18 mm).

sample size calculation for subsequent randomized controlled trial was performed using the incidence of vomiting after initiation of therapy as a primary outcome endpoint.

Results

Description of the patients' collective

The descriptive analysis of clinical records revealed 18 children (8 girls), aged from 0.5 to 10 years (mean 3.3 years), who received antiemetic acupuncture in addition to standard therapy. The underlying disease was gastroenteritis (GE) in 10 patients,

Table 1 Patient characteristics and clinical observations following acupuncture treatment.

Nr	Age [yr]	Sex	Dg. #	Duration of V† [d]	Incidence of V after acupuncture	Time to V after acupuncture [d]	Length of Hospitalization [d]	Parents interview: "Acupuncture helped?"**	Parents interview: "Acupuncture treatment again?"**
1	0.5	m	GE	0.0	0		4.0	0	0
2	1.25	m	GE	4.0	0		2.0	1	1
3	1.5	m	PM	1.0	1	5.0	11.0	0	0
4	1.5	m	PM	1.0	1	3.0	4.0	1	1
5	3.0	m	GE	3.0	1	1.0	1.0	X	X
6	1.25	f	PM	0.0	0		4.0	1	1
7	8.0	m	PM	1.0	0		5.0	1	1
8	5.0	f	GE	2.0	0		2.0	X	X
9	0.75	m	GE+PM	0.0	0		3.0	1	1
10	3.25	f	GE	1.0	1	1.0	1.0	X	X
11	6.25	f	GE	3.0	0		2.0	1	1
12	3.5	f	GE	3.0	0		1.0	0	1
13	3.5	f	GE+PM	1.0	0		2.0	1	1
14	5.25	m	GE	1.0	0		1.0	X	X
15	2.25	f	PM	0.0	0		9.0	X	X
16	1.25	m	GE	1.0	0		2.0	X	X
17	0.5	m	GE+PM	1.0	1	1.0	2.0	1	1
18	10.0	f	GE	2.0	0		3.0	1	1

#Diagnosis of individual patients: GE=Gastroenteritis, PM=Pneumonia

†Duration of Vomiting before admission

*0=no, 1=yes, X=no attendance

pneumonia (PM) in 5 patients and 3 were diagnosed with both GE and PM (◉ Table 1).

Acceptance and safety of acupuncture

The application of the AA needles was feasible and well tolerated in all children (18/18). None of the patients revealed signs of anxiety before and during insertion of the needles. All patients received acupuncture at the beginning of the therapy immediately after admission to the hospital. Indwelling needles remained at P6 for 2–3 days. 9 of 12 parents declared that acupuncture helped to stop vomiting and that 10 out of 12 would choose acupuncture in the future to treat vomiting. 3 parents did not indicate that acupuncture relieved vomiting and 2 of them would not use acupuncture again for the treatment of vomiting. The children (n=3) of parents indicating that acupuncture did not help had the following outcome: one child with PM vomited once on the 5th day after application of the needle and in 2 children with GE vomiting stopped immediately after application of the needles. No adverse effects during acupuncture were registered. There were no skin lesions under the acupuncture therapy with indwelling acupuncture needles.

Clinical effects

In 13 out of 18 patients vomiting ceased immediately following the first acupuncture treatment and did not reappear (◉ Table 1). In 5 other patients, vomiting was observed only once after acupuncture. In 3/5 (2 GE; 1 GE + PM) vomiting occurred once on the 1st day after initiation of acupuncture, in 1/5 (PM) on the 3rd day and in 1/5 (PM) on the 5th day after acupuncture. None of the patients required conventional antiemetic medication. The development of severe dehydration requiring intensive therapy or invasive monitoring was not observed. Patients were discharged from the hospital on the 4th (3–5) day (median (range)). For patients with GE, the length of stay was shorter: 2 (1–4) days (median (range)).

Sample size calculation for randomized controlled trial

Based on these observations we calculated the sample size for a controlled trial with the null-hypothesis that acupuncture stimulation of P6 is not better than standard therapy with conventional antiemetic drugs using the cessation of vomiting within 8 h after the initial administration of either intervention. Assumptions for the calculation of the sample size are based on this descriptive data and on results of previously published studies [1]. A 30% difference between the groups in the incidence of vomiting after intervention is considered clinically relevant. Based on the primary endpoint, 39 patients per group had to be included to detect this difference with a power of 80% and $\alpha=0.05$.

Discussion

▼ The use of acupuncture for the treatment of vomiting associated with common infectious diseases was for the first time evaluated in this descriptive analysis [2]. The procedure of insertion and stimulation of fixed indwelling acupuncture needles was feasible and well accepted by both children and their parents. Interestingly, the stimulation of acupuncture point P6 was associated with immediate cessation of vomiting in the majority of patients without the need for administration of antiemetic medication. In recent controlled trials the effectiveness of P6 stimulation for prevention of postoperative nausea and vomiting was evaluated suggesting the antiemetic effect of P6 stimulation, which was comparable to the effect of antiemetic medication [3, 14, 16, 24]. Importantly, the effect of antiemetic medication including ondansetron and dimenhydrinate reported in the literature appears not superior to our observation with acupuncture. In placebo-controlled clinical trials in pediatric patients with GE, 14–49% of the children with GE vomited once after ondansetron administration, 30% vomited after dimenhydrinate, in comparison to 35–67% vomiting in the placebo control [7, 18–20, 23, 25]. In our descriptive analysis, the single treatment with P6 stimula-

tion was associated with the immediate cessation of vomiting in the majority of the children. Only 2 out of 10 (20%) children diagnosed with GE vomited once after acupuncture, postulating the long-term effect of P6 stimulation due to the insertion of the indwelling fixed needles. This might be a potential advantage over other non-invasive psychological therapies (e.g. clown visits to hospitalized pediatric patients), which demonstrated only short-term effect to improve the psychological well-being of children [17].

Moreover, none of our patients required antiemetic drugs after acupuncture therapy. Furthermore, it is postulated, that the application of acupuncture in the pediatric population is complicated by the children's fear of needles [21]. However, none of the children in our study reported fear of the acupuncture needles. This observation is most likely associated with the design of the AA needles, which were originally designed for so-called auricular acupuncture. These needles resemble a small "sticker" with a length of 1.5 mm in contrast to the long standard acupuncture needle, used for body acupuncture. Indwelling needle "stickers" can be safely applied for 2–3 days, so children experienced needle insertion only once at the beginning of the antiemetic acupuncture therapy. Most children hardly notice needle insertion while the "sticker" was placed on the skin. Similar observations were reported in a survey of children with severe chronic pain, showing that children in pain found acupuncture treatment pleasant and helpful [13]. Although this descriptive observation analyzed only a small number of patients with N&V of different etiology without using a control group, several valuable observations were made useful to design a randomized trial. Importantly, the immediate cessation of vomiting in the majority of the patients, the absence of additional use of antiemetic therapies and the high acceptance rate with complete absence of the fear of needles provide an important base line for the design of a randomized multicenter clinical trial. Since a site-specific antiemetic effect of P6 was already demonstrated in a variety of randomized clinical trials [4,6,10,13,14], the design of our future trial will not implement a question related to the location of needle placement. Therefore we aim to compare P6 stimulation with standard therapy regimen, using conventional antiemetic drugs, which constitute an accepted and established method in clinical acupuncture research [15]. This type of design will allow an evaluation of the entire clinical effect of acupuncture including, non-specific and specific physiological effects.

In case of acupuncture benefit for children on chemotherapy [10], N&V definitely had anticipatory pathophysiological component [22], which might have been sensitive to psychological (placebo) effect of acupuncture. However, in the context of infectious diseases the type, origin and mechanism of N&V are not completely understood. In this case the placebo arm would be helpful to distinguish the psychological effect of acupuncture.

Conclusion

▼ Stimulation of the P6 acupuncture point using indwelling fixed needles was feasible and revealed a high acceptance rate. This method may be an effective supportive therapy for vomiting in children with common infectious diseases, such as GE. Our descriptive data provide the sample size calculation for the design of an adequately powered, randomized multicenter controlled trial.

Conflict of interest: The authors have no conflict of interest to disclose.

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