

Adverse effects of acupuncture

Which are clinically significant?

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ABSTRACT

OBJECTIVE To review potentially serious adverse events associated with acupuncture.

QUALITY OF EVIDENCE Studies in the medical literature primarily provide level II evidence from retrospective reviews, case reports, and prospective surveys of practitioners.

MAIN MESSAGE Both the general public and physicians are becoming more interested in the ancient Chinese medical practice of acupuncture. This paper discusses the basic philosophy of acupuncture and describes adverse events that might be associated with acupuncture treatment. Some events, such as nausea and syncope, can be mild and transient, but rare events, such as septicemia and hepatitis C infection, can be fatal. As the role of acupuncture in today's multidisciplinary clinics increases, the complications of acupuncture, although infrequent, cannot be overlooked.

CONCLUSION Responsible clinicians practising acupuncture and seeing patients who use acupuncture should be aware of the adverse events associated with it.

RÉSUMÉ

OBJECTIF Faire le point sur les effets secondaires sérieux pouvant résulter de l'acupuncture.

QUALITÉ DES PREUVES Les travaux publiés dans la littérature médicale fournissent des preuves de niveau II à partir d'études rétrospectives, d'études de cas et d'enquêtes prospectives auprès de médecins.

PRINCIPAL MESSAGE Les médecins et le public en général sont de plus en plus intéressés à cette ancienne technique de la médecine chinoise qu'est l'acupuncture. Cet article discute de la philosophie qui sous-tend cette pratique et décrit les effets indésirables susceptibles de survenir avec cette forme de traitement. Certains phénomènes comme les nausées et syncopes sont habituellement transitoires et sans conséquence, mais des complications rares comme la septicémie et l'hépatite C peuvent être fatales. Comme l'acupuncture occupe une place de plus en plus importante dans les cliniques multidisciplinaires, il importe d'en connaître les complications, si rares soient-elles.

CONCLUSION Tout médecin responsable qui pratique l'acupuncture ou qui traite des patients qui recourent à ce traitement devrait en connaître les effets indésirables.

This article has been peer reviewed.

Cet article a fait l'objet d'une évaluation externe.

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Acupuncture, a form of Chinese medicine, is gaining popularity among health care providers as more patients seek complementary and alternative medicine (CAM) to treat their diseases.^{1,2} Chiropractic, acupuncture, homeopathy, herbal medicine, and traditional Chinese medicine are forms of CAM. Acupuncture is practically defined as use of needles placed transcutaneously along a set of defined points to treat diseases and their symptoms, and to restore health. Acupuncture is used in many clinical scenarios including pain management,^{3,4} addiction treatment,⁵ and alleviating symptoms of menopause.⁶ All health care providers should be aware that acupuncture could have adverse effects. In this article, we present background information on acupuncture and discuss its prevalence and the clinically significant adverse effects associated with it.

Quality of evidence

We searched AMED (1985 to 2002), CINAHL (1982 to 2002), Cochrane Library (Issue 2, 2002), e-Psyche (1993 to 2002), Health Technology Assessment (1988 to 2002), MEDLINE (1966 to 2002), the National Health Service (NHS) Economic Evaluation Database (1975 to 2002), and TOXLINE (1966 to 2002) using the MeSH terms “acupuncture,” “acupuncture therapy/adverse effects,” and “medical errors.” We supplemented this search by looking for unpublished research on the website ClinicalTrials.gov (to March 2002) and the NHS National Research Register (to March 2002). We also contacted authors of published studies, hand-searched key journals, and searched the bibliographies of reviews.

Adverse events are generally reported as case studies (level III evidence). Some systematic reviews have examined adverse events reported in prospective surveys and clinical trials (level I evidence).⁷⁻⁹ Most adverse events are reported by medical reporting centres. The proportion of adverse events not reported is unknown, particularly among the patients of acupuncturists who are not physicians.

Philosophy of acupuncture

The history of acupuncture dates back more than 4000 years to when early Chinese practitioners used acupuncture instruments made of stone.¹⁰ At the

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time, knowledge of the anatomy and physiology of the human body was limited, yet Chinese doctors mapped out acupuncture points based on 14 meridians.¹¹ These meridians are anatomical points through which the “qi,” or energy, of various organs flows. According to Chinese philosophy, acupuncture is based on the theory of yin and yang, which are both complementary and opposites and can be used to describe how all entities exist and function in relation to each other in the universe. Acupuncture helps restore the yin-yang balance in the body.¹² While the physiologic effects and therapeutic mechanisms of acupuncture therapy are debated and researched, a growing body of evidence supports its use for certain conditions.

Use of acupuncture

A national telephone survey in the United States showed that the number of people using at least one form of CAM increased from 33.8% in 1990 to 42.1% in 1997.¹³ The survey also showed that patients were no more likely to disclose their use of CAM to their physicians in 1997 (38.5%) than they were in 1990 (39.8%). According to a survey in Denver, Colo, 76% of physicians reported having patients who used CAM, 59% had been asked about specific CAM treatments, and 48% had recommended CAM to a patient.¹⁴ A survey conducted among family physicians in Ontario and Alberta showed that 54% referred patients to CAM practitioners and 16% practised some form of CAM.¹⁵

Acupuncture is a commonly used therapy among those who seek CAM. A US study showed that among family practice patients who used CAM, 16% used acupuncture.¹⁶ Family physicians use acupuncture for pain management, for musculoskeletal conditions,¹⁷ for cancer,¹⁸ and for postoperative conditions.^{19,20}

Practitioners

There has been a steady increase in practice of acupuncture among various health professionals.²¹ A survey of 80 Israeli family physicians (51% men, 48% women) showed that 24% reported practising one or more CAM therapies, most commonly acupuncture (28%).²² According to the British Medical Acupuncture Society,²³ other health care providers, such as licensed acupuncturists, chiropractors, naturopaths, and physiotherapists, also practise acupuncture.

Currently, there is no standard training for practitioners. Training in acupuncture varies from weekend courses to postgraduate university sessions. Advanced training is available to physicians at McMaster University and can earn physicians continuing medical education credits. More than 1100 licensed health

care practitioners currently practise acupuncture in Canada. The number of unregulated acupuncture practitioners is unknown. Three provinces in Canada regulate acupuncture: Alberta, British Columbia, and Quebec. According to a survey of family physicians in Quebec, 11% (13/121) of family physicians reported knowing a lot about acupuncture, but only 8% (9/118) had received previous training in acupuncture.²⁴

Risks associated with acupuncture

The benefits of any therapy are of clinical importance, but the safety of treatments should be a priority in clinical practice. Although most adverse effects associated with acupuncture are minor and serious complications are rare, practitioners should not overlook them (Table 1).

Table 1. Potential adverse events associated with acupuncture

COMMON ADVERSE EVENTS	RARE COMPLICATIONS
Fainting during treatment	Pneumothorax
Nausea and vomiting	Spinal cord injury
Increased pain	Hepatitis B
Diarrhea	Septicemia
Local skin irritation	Punctured organs
• Bruising	Convulsions
• Needle site bleeding	Argyria
Psychiatric disturbance	
Headaches	
Sweating	
Dizziness	
Aggravation of symptoms	
Needle breakage	

Two prospective studies in the United Kingdom assessed the occurrence of adverse events.^{25,26} In one study, 48 medical doctors (members of the British Medical Acupuncture Society) and 30 physiotherapists (members of the Acupuncture Association of Chartered Physiotherapists) reported adverse effects of 32 000 acupuncture treatments.²⁵ Results showed that minor adverse events, defined as “any ill-effect, no matter how small, that is unintended and non-therapeutic, even if not unexpected,” resulted from 6.71% of treatments. Most common minor events were needle site bleeding (3.1%), needle site pain (1.1%), and aggravation of symptoms (0.96%) (70% of symptoms subsequently improved). In the second study, 574 professional acupuncturists (members of the British Acupuncture Council) reported adverse effects of 34 000 acupuncture treatments.²⁶ Minor adverse events occurred in 15% of cases; the most common were aggravation of symptoms (2.8%), bruising (1.7%), needle pain (1.2%), and needle site

bleeding (0.4%). Most (86%) aggravated symptoms improved, possibly indicating a “healing crisis,” which is a therapeutic process involving temporary exacerbation of existing symptoms that precedes improvement. These two studies reported no life-threatening events associated with acupuncture. It should be noted, however, that in self-reporting studies, over-reporting and under-reporting are inherently unavoidable.

Another prospective study, done in the Czech Republic, surveyed 140 000 acupuncture treatments between 1975 and 1988 and found that 7% of patients felt faint and 0.28% actually fainted.²⁷ During the 13 years under investigation, two patients' lungs were punctured, resulting in pneumothorax (incidence of pneumothorax was relatively rare at 1/70 000 treatments).

A systematic review on the safety of acupuncture showed a range of common adverse effects.⁸ In nine studies reviewed, the most common adverse events found were needle pain (1% to 45%), tiredness (2% to 41%), and bleeding (0.03% to 38%). Incidence of faintness and syncope ranged from 0% to 0.3%. Feelings of relaxation were reported by 86% of patients. Pneumothorax was rare, occurring only twice in nearly a quarter of a million treatments.

Complications arising from needle breakage and intentionally embedded needles are uncommon but warrant caution. A systematic review of adverse events of acupuncture occurring between 1987 and 1999 found 25 cases of pneumothorax, 18 cases of spinal cord injury, 11 cases of acute hepatitis B, 10 cases of localized argyria, and two deaths from infection.²⁷ Needle breakage, including 26 cases of intentionally embedded needles and 16 cases of accidental breakage, caused 48 adverse events. There were also 10 cases of injury from self-treatment.

A case report described two patients with multiple health problems, including long-standing rheumatoid arthritis, who died several months after acupuncture treatment.²⁸ Both patients were admitted to hospital with acute joint swelling and fever; laboratory tests found positive cultures for hemolytic *Staphylococcus aureus*. No information was given about the practitioners or the sterilization procedures used. The author implied a direct link between acupuncture and staphylococcal septicemia, but the likelihood of the sepsis being needle-induced is questionable.²⁹

A case report of a 40-year-old woman who died because a needle punctured her heart should alert acupuncture practitioners to the dangers of deep penetration at certain acupuncture points.³⁰ The woman, who had an undiagnosed sternal foramen, had a needle inserted at REN 17 (shangzhong/tanzhong)

(Table 2). Shortly after insertion, she complained of chest pain and asked to have the needle removed immediately. Chest radiography revealed a sternal foramen at the point of needle insertion (fourth intercostal space). The report concluded that the needle could easily have passed through the fat and connective tissue of the foramen, punctured the heart, and caused cardiac tamponade. Although not widely recognized, holes in the sternum are not uncommon. As many as 9.6% of men and 4.3% of women have congenital foramina of the sternum.³¹ Deep perpendicular needling at REN 17 is, therefore, contraindicated for patients with congenital sternal foramina; oblique or transverse needling should be used.³²

Table 2. Precautions for needling certain areas of the body

For pregnant women, avoid needling points on the abdomen and lumbar region, and certain points known to cause strong sensations (large intestine 4, spleen 6, bladder 60, bladder 67)

Avoid points on the scalps of infants with open fontanelles

Needling points close to the eyeball requires definite angle, depth, and skill (stomach 1, gallbladder 1, bladder 1). Avoid using these points and avoid manual manipulation, such as lifting or thrusting

Avoid deep perpendicular penetration of points on thoracic and lumbar regions due to risk of puncturing internal organs

Avoid deep and perpendicular penetration of points around the gastric cavity when the stomach is full

Deep penetration of gallbladder 21 puts patients at risk of pneumothorax

Deep penetration of ren/governing vessel 17 puts patients at risk of heart injury

Avoid deep penetration of points at base of skull inferior to occiput (gallbladder 20, ren/governing vessel 16, and bladder 10) due to risk of injuring the medulla oblongata

Comparison of the rate of adverse events from acupuncture with those from drugs routinely prescribed in primary care suggests that acupuncture is a relatively safe treatment.³³ Nevertheless, practitioners should be aware that acupuncture can have adverse events, and patients should be informed of this. Taking a thorough medical history is essential for recognizing conditions that increase risk of complications.

Some acupuncture pins are intentionally embedded in the skin for prolonged periods, from days to a week. Practitioners should monitor these pins for signs of infection. In our literature review, although we found no absolute contraindications to acupuncture, we did find conditions that increase risk of complications

(Table 3) and concerns about needling certain areas of the body (Table 2).

Table 3. Risk factors for complications of acupuncture

BLEEDING

Hemophilia can affect clotting factors

Advanced liver disease could compromise production of clotting factors

Patients taking blood thinners could bleed for longer periods

INFECTION

Patients with HIV infection or immunocompromised patients are at increased risk of opportunistic infections

Patients with diabetes are subject to poor wound healing; neuropathy can reduce sensory ability, leaving them at increased risk of undetected infection

Patients who have had transplants often take immune suppressants that make them prone to infections

High-dose steroids suppress the immune system

Open wounds increase risk of infection

FAINTING

Hypoglycemic, nervous, or very fatigued patients might faint

Training in acupuncture

Proper training in acupuncture is essential for maintaining high standards of safety. An Australian study found that less than 1 year's training resulted in 2.07 adverse events per year; 37 to 48 months' training reduced this to 1.35 adverse events per year; and 49 to 60 months' training reduced this further to 0.92 adverse events per year.³⁴

Conclusion

Awareness of the common adverse effects of acupuncture will help practitioners recognize and manage these effects. Patients should be forewarned of potential common, though minor, adverse effects. Needle penetration might cause pain and bleeding. Reports of fainting remind practitioners that patients might be better off prone than sitting during treatments. Practitioners should keep some potentially fatal effects in mind when patients report shortness of breath, pleuritic chest pain, or fever after acupuncture treatment. All acupuncture practitioners should have proper training in techniques and safety. Raising educational and professional standards will maximize safety and minimize risk of adverse events. ✦

Competing interests

None declared

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Editor's key points

- Acupuncture is increasingly used by both complementary and traditional medical practitioners, for example, for pain management in musculoskeletal conditions, cancer, and postoperative recovery.
- The extent of actual risk is difficult to quantify, but several studies show that between 6% and 15% of patients have side effects, usually minor, including needle pain, bruising, and aggravation of symptoms.
- A few case reports describe serious, even fatal, side effects, such as pneumothorax, spinal cord injury, hepatitis, cellulitis, and the results of broken or embedded needles.
- Conditions that increase risk of complications include hemophilia, advanced liver disease, anticoagulation therapy, diabetes, HIV infection, other forms of immunosuppression, high-dose steroids, and open wounds. Needling near the eye or deeply penetrating the chest or spinal cord should be done with caution.

Points de repère du rédacteur

- L'acupuncture est de plus en plus utilisée en médecine traditionnelle comme en médecine alternative, notamment pour soulager la douleur due aux affections musculo-squelettiques et au cancer et durant la guérison post-opératoire.
- Il est difficile de quantifier le risque réel, mais plusieurs études montrent qu'entre 6 et 15% des patients présentent des effets indésirables, habituellement bénins, incluant des douleurs à la puncture, des ecchymoses et l'aggravation de certains symptômes.
- Quelques études de cas décrivent des effets secondaires sévères et même fatals, comme des pneumothorax, des lésions de la moelle épinière, des hépatites, des cellulites et les problèmes résultant d'aiguilles brisées ou semi-permanentes.
- Parmi les conditions qui augmentent le risque de complication, mentionnons l'hémophilie, les maladies hépatiques avancées, l'anticoagulothérapie, le diabète, le SIDA et autres formes d'immunosuppression, la corticothérapie à haute dose et les blessures ouvertes. Les punctures près de l'œil et celles qui entrent profondément dans la poitrine ou dans la moelle épinière exigent des précautions particulières.

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