Complications of Acupuncture

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Summary
Acupuncture as a treatment modality is now more widely used by the medical profession. It behoves both practitioners and patients to be aware of possible complications, the majority of which can be avoided with cautious and prudent use of this ancient therapy.

There have been many isolated reports of complications of acupuncture in the literature. We surveyed the literature identifying all articles referring to complications of acupuncture. Our findings are presented and discussed.

Key words
Acupuncture, Acupuncture complications.

Introduction
Acupuncture has been practised in the West for many years and referred to in the literature as far back as the first publication of the Lancet (1). However, it was practised very little until the 1970s when political changes facilitated cultural exchanges between China and the west. Since then there has been an increased interest and acceptance of acupuncture by the medical establishment. Figures from the British Medical Acupuncture Society attest to the increasing numbers of doctors interested in the subject in the United Kingdom. Their membership (the majority being general practitioners) increased from 511 in 1988 to 1008 in 1992. This does not include doctors, paramedical and lay practitioners who have trained through other organisations; the majority of these are listed in the "Directory of British Acupuncturists", which contained 1061 members in 1992.

Complementary medicine has the public reputation of being safe; indeed many acupuncturists have been working for decades with no apparent problems. However, serious complications have been reported. With wider availability of acupuncture both in the National Health Service and private practice, there is a need for practitioners and patients to be aware of possible complications of acupuncture. We hope that a thorough review of the literature will give an appropriate perspective on this issue.

Acupuncture
The word acupuncture means “puncturing the skin with a needle”, but the discipline of acupuncture involves much more than that. Classically, in China and the Far East, this technique has been combined with other therapeutic modalities such as herbs, massage and moxibustion. Moxa is the dried leaves of Artemisia vulgaris made into various forms: “punk” is loose moxa, rather like green cotton wool, while “moxa-rolls” are like cigars. The heat is usually applied gently by holding a glowing moxa-roll about two centimetres from the point. In the Far East “cauterising moxibustion” is often used, where loose punk is burned on the skin until blisters form.

The common factor linking these diverse therapeutic modalities is the vitalistic paradigm of “Chi” (vital force or energy); health being the state of balance and harmonious flow of the Chi while disease is a manifestation of disrupted flow. The various techniques are intended to influence the flow of Chi in different ways. In recent years the term TCM (traditional Chinese medicine) has been widely adopted to refer to this broad area of activity.

In contrast to this, workers following the paradigm of orthodox medicine have developed acupuncture in other directions such as electroacupuncture, transcutaneous nerve stimulation and “laser puncture” (the use of low-power lasers to stimulate the acupuncture points). “Medical acupuncture” is used to emphasise this western scientific approach.

Method
We performed a literature survey using the Complementary & Alternative Therapies database, the Medline database (1966 to 1993) and extensive cross referencing to identify reports of complications.
of acupuncture. All English language articles identified were studied in detail.

**Results**

**Immediate complications**

The commonest side effect is bleeding (2) on withdrawal of the acupuncture needle. This is often minimal and easily dealt with. Haematoma at the site of needle insertion has been reported (2), presumably due to inadvertent arterial puncture. In this case, a hand was transfixed with one needle, resulting in a golfball-sized haematoma. Bruising at needle sites has also been reported (3, 4), where facial acupuncture points were utilised resulting in orbital ecchymosis. Petechiae (5) in a child have been reported, the clue to the aetiology of the lesions being the symmetrical nature of the lesions and a history of acupuncture. Often patients with an atopic tendency develop transient erythema at the needle site (6, 7).

A compartment syndrome has been reported (8) following acupuncture in an anticoagulated patient. It is not clear whether the acupuncturist was aware of the patient's medical history and current medication. The patient required an operation to decompress the affected limb. Syncope (9, 10) occurred in 0.19% in one series. The vaso-vagal fainting episodes usually occurred in young male and elderly patients in the early phase of the treatment.

Drowsiness can occur during and after acupuncture, in fact acupuncture can be soporific. There is a potential risk where patients driving home after treatment may be a danger to themselves and others. In one study (11) 56% of patients attending a pain clinic in Norway were moderately drowsy after treatment. It is possible that acupuncture potentiated the sedative effects of concurrent medication. Thus patients previously stable on analgesics may have become excessively drowsy, however there was no mention of the prescribed medication to assess this possibility. Persistent pain following acupuncture has been reported (12).

**Dermatology**

There have been reports of contact dermatitis (13) to nickel (14-16), chromium (17) and zinc (18). All cases were reported in individuals who had a history of allergy and tested positive to patch tests for the respective metals. This reflects the diversity of the types of acupuncture needles employed: most are stainless steel, but some practitioners prefer silver and gold ones.

Some workers have linked acupuncture with various oddities such as prurigo pigmentosa (17), blue macules of localised argyria (19), a case of multiple lymphocytoma cutis of the ears (20) and even a case of skin carcinoma (21). Koebner phenomena at the needle insertion sites has been described in a patient suffering from psoriasis (22). Third degree burns, eschars and scars (23) have been reported mainly from the use of moxibustion. Hot needle acupuncture has also resulted in scarring (24). A case of abrasions of the shoulder (25) has been reported where a sharp instrument was used to abrade skin in addition to needle insertion.

**Pneumothorax**

There have been many reports (23, 25-48) of this serious complication throughout the world. From an analysis of the reports, it is apparent that needle insertion on the thorax, particularly the intercostal spaces, paraspinal areas and supraclavicular regions can result in the puncture of the pleura and the lung parenchyma, leading to unilateral or bilateral pneumothorax. The patients invariably developed acute chest pain and dyspnoea during needle insertion with gradual and progressive deterioration. Sometimes (43) a chest X-ray taken immediately failed to demonstrate the lesion. In such cases, it is important to repeat the X-ray 24 hours later. Occasionally (40) the diagnosis of pneumothorax was missed even though it was evident on X-ray. All the cases reported were admitted and treated with chest drains leading to successful recovery. Haemothorax (23) has also been reported but is much rarer.

There is one case (26) of a male volunteering to have acupuncture demonstrated at a New Year's party by a man who proceeded to insert needles in his anterior chest. The volunteer developed chest pain and whilst in hospital recalled that one needle inserted through his nipple had penetrated his chest much deeper than the other needles. This is clearly
a case of malpractice. Acupuncturists are commonly taught that needling is contraindicated at the nipple point.

Cardiovascular trauma
There has been a fatality due to self acupuncture (49). The needle had penetrated the pericardium and caused cardiac tamponade. More fortunate victims of self acupuncture have been operated upon and survived (50-52). There have been two reports (53, 54) of deep venous thrombophlebitis following acupuncture.

Retained needles
Incidental radiological findings
There have been reports (55-61) of fine linear metallic foreign bodies found incidentally on various X-rays. The differential diagnosis would include parasites, sutures, etc. The patients, usually of oriental origin, give a history of having had acupuncture by the okibari technique (a controversial technique peculiar to Japan, where solid needles are inserted into the skin permanently, the protruding part being cut off). The number of permanent subcutaneous needles varies widely; one patient had over 200 needles.

Trauma to spinal cord
There have been a number of reports (62-74) mainly from Japan, of trauma to the spinal cord and spinal nerve root during needle insertion or due to migration (75) of retained needles. Trauma to the patient (e.g. a fall) can result in movement of a retained needle, leading to injury of vital structures. Patients present with focal neurological signs, and radiological examinations reveal the culprits, which then require surgical removal. There have been isolated reports of spinal arachnoiditis (76) and subarachnoid haemorrhage (77, 78).

Miscellaneous reports
There have been reports of acupuncture needles in the kidney parenchyma (79, 80) and the urinary tract, leading to calculus formation (81-83), the abdominal cavity (84) and the subcutaneous tissues. A man presented with haematuria and an X-ray revealed a metallic object in his pelvis. An acupuncture needle was retrieved by cystoscopy. He admitted inserting the needle into the urinary meatus to clear some glue which had become stuck to his penis (85). Foreign body granuloma reaction to acupuncture needles have been noted (86, 87). An accidentally broken needle has been surgically removed from the median nerve (88), some time following the acupuncture. Nerve injury resulting in sympathetic dystrophy has been reported (89, 23).

Bacterial infections
Perichondritis
Auricular acupuncture lends itself to the use of press needles (small needles for indwelling use in auricular therapy which may be left in place for one week or longer to produce continued effect). These needles are inserted at known auricular acupuncture points or at any tender areas of the ear. There have been reports of chondritis and perichondritis (90-98). These are potentially serious complications as the treatment may entail parenteral antibiotics and surgical intervention. Some of the patients were left with a cosmetically deformed ear following treatment.

Septicaemia
There are reports of septicaemia (102, 103) due to staphylococcus aureus, two of which resulted in death (104). The latter had complex past medical histories and were debilitated. Press needles were used in both cases. In one case (103) acupuncture around a knee joint resulted in septicaemia with fulminant disseminated intravascular coagulation.

Viral infections
Hepatitis
Doctors visiting China who have seen the practice of acupuncture in a rural setting have expressed concern (107) at the lack of aseptic technique. Some have speculated (108, 109) about a link between the use of acupuncture and the high prevalence of hepatitis and hepatocellular carcinoma in China. There have been definitive reports (110-123) of dissemination of hepatitis B and non-A, non-B (now termed C, D and E). The first report in the UK (124, 125) was influential because practitioners switched over to using sterile disposable needles and standards were generally improved. A practitioner was noted to have poor hygienic technique; he was seen to handle the needle points before and after insertion. He himself became infected through a
needle stick injury. However, his technique was unusual in that he used hollow needles. Other well documented hepatitis outbreaks have occurred where standard, solid acupuncture needles were used and the infections were all attributed to failure to adhere to strict aseptic technique. One practitioner dipped his used acupuncture needles into Calendula ointment (118), another used a disinfectant (116) to clean his needles. Neither technique is effective to sterilise needles.

Acquired immune-deficiency syndrome
There has been much publicity about acquired immune-deficiency syndrome and speculation that acupuncture can transmit human immuno-deficiency virus. There have been no proven cases, although we have identified one reported case (126) suggesting that acupuncture was implicated. This was a 17 year old French male who did not have any risk factors for acquired immune-deficiency syndrome. He received acupuncture for tendinitis and subsequently developed the symptoms of acquired immune deficiency syndrome. In a study (127) looking at cases of acquired immune-deficiency syndrome patients without any apparent risk factors, 2 were found to have had acupuncture before symptoms developed.

Herpes zoster
An interesting case (128) of reactivation of cutaneous lesions 12 hours after each acupuncture treatment has been reported. The lesions occurred at the same site, which was distant from the needle site.

Deterioration of disorder under treatment
There has been one case (23) of an asthmatic who discontinued all his medication whilst undergoing acupuncture for his illness. He progressively deteriorated and developed status asthmaticus. This is not a complication of acupuncture, of course, but a consequence of inadvisedly discontinuing medication.

Electroacupuncture
This can impair the function of a demand type pacemaker (129). It remains a theoretical risk as no cases have been reported, however it would be prudent not to administer electroacupuncture to any patient with a pacemaker.

Discussion
Our literature search revealed over one hundred papers reporting complications of acupuncture, of which there were a total of 395 cases of complications (Table 1). Some of these were highly speculative (21, 126). Others reported minor complications such as syncope, bleeding, bruising and burns from moxibustion. These are phenomena which many acupuncturists are aware of and are likely to be under-reported. On the other hand there may be a bias towards publication of complications of acupuncture by orthodox journals.

Patients often expect the adverse effect of pain during acupuncture. Traditionally a strong De-Qi is obtained (130). This is a characteristic sensation which arises when an acupuncture point is successfully stimulated. It is distinct from the simple pin-prick sensation and is variously described as dull, numb, swelling, sore or radiating along a limb to nearby acupuncture points. It may be experienced as pain by some patients especially if they have not been forewarned, or if their pain threshold is low. However, many successful treatments proceed with the patient feeling no sensation at all (131).

Excluding the speculative reports and the minor complications, we identified 216 instances of serious complications worldwide over a 20-year period. Considering that 3% of the adult population of the United Kingdom consulted acupuncturists in 1984 (132), these figures are reassuring. However, even a single occurrence is undesirable, so we offer the following suggestions.

Pneumothorax
Pneumothorax is easily avoided by good anatomical knowledge and a high degree of caution in the needling of certain points. All practitioners have a responsibility to ensure that they have studied adequately the anatomy of all points at which they

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<tr>
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<td>Bruising</td>
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<tr>
<td>Burns (eschars, scars)</td>
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<tr>
<td>Cardiac Trauma</td>
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<td>Compartment syndrome</td>
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<td>8</td>
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<tr>
<td>Contact dermatitis</td>
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<td>13-18</td>
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<tr>
<td>Deep venous thrombophlebitis</td>
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<td>53-54</td>
</tr>
<tr>
<td>Drowsiness</td>
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<td>11</td>
</tr>
<tr>
<td>Endocarditis</td>
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<td>99-101</td>
</tr>
<tr>
<td>Erythema</td>
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<td>6-7</td>
</tr>
<tr>
<td>Granuloma</td>
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<td>86-87</td>
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<tr>
<td>Haematoma</td>
<td>1</td>
<td>2</td>
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<tr>
<td>Haemothorax</td>
<td>1</td>
<td>23</td>
</tr>
<tr>
<td>Hepatitis</td>
<td>126</td>
<td>110-123</td>
</tr>
<tr>
<td>Herpes zoster reactivation</td>
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<td>128</td>
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<tr>
<td>Koebner phenomenon</td>
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<td>22</td>
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<td>Multiple lymphocytoma cutis</td>
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<td>20</td>
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<tr>
<td>Osteomyelitis</td>
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<tr>
<td>Pain</td>
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<td>Perichondritis</td>
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<tr>
<td>Peripheral nerve injury</td>
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<td>Pneumothorax</td>
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<td>23,25-48</td>
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<td>Septicaemia</td>
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<td>102-104</td>
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<td>Spinal cord injury</td>
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<td>62-76</td>
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<tr>
<td>Spinal infection</td>
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<td>105</td>
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<tr>
<td>Subarachnoid haemorrhage</td>
<td>2</td>
<td>77-78</td>
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<tr>
<td>Syncope</td>
<td>33</td>
<td>9-10</td>
</tr>
</tbody>
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Table 1
COMPLICATIONS OF ACUPUNCTURE

References

130
131
132
propose to insert needles. With points on the anterior, lateral or posterior thorax and those in the anterior and posterior triangles of the neck, particular attention must be given to the depth and direction of needle insertion.

Retained needles
The commonest reason for retention of needles is the okibari technique. We recommend that this practice should be avoided. However, needles do occasionally break off accidentally (133) while in use. This is often due to muscle movement or spasm during treatment and is more likely to occur if old needles are being used. Patients should be advised not to move during treatment and the condition of the needles checked when they are removed. If breakage has occurred, the fragments must be removed immediately.

Press needles
The commonest use of press needles is for the treatment of smoking and obesity. Press needles were implicated in all the reports of perichondritis except one case where intradermal needles were inappropriately used. The reports did not mention whether aseptic technique was adhered to and if so what this entailed. If strict aseptic technique (adequate disinfection of the skin and avoiding handling the sterile needles) is practised, then infection will be unlikely. The proper use of an alcohol swab is important, i.e. the skin should dry by evaporation before needle insertion.

Endocarditis
The reports of endocarditis raise important questions about the suitability of vulnerable patients for acupuncture. In the correspondence following the first report of endocarditis (100), Cheng (134) criticised prophylactic measures suggested by the authors of the report. It had been suggested that antibiotic prophylaxis be used in all patients with cardiac lesions undergoing acupuncture. However acupuncture is not a single procedure, but entails a course of treatment, therefore it would be impracticable and uneconomical to use antibiotics for each acupuncture session. Moreover both reported cases occurred with the use of press needles, retained in the skin for up to a week. It would be sensible for patients who have prosthetic or damaged heart valves not to have acupuncture involving press needles. In the history, practitioners should inquire whether patients have had cardiac surgery or rheumatic fever. Auscultation of the heart may well be important, yet is likely to be omitted where simple anti-smoking treatment has been requested.

Hepatitis
Transmission of hepatitis B infection via acupuncture needles is well recognised. This can be prevented by using sterile needles. The need to autoclave reusable needles and the fact that these needles become blunt with repeated use are the main disadvantages of using such needles. It is far more convenient and relatively inexpensive to use sterile, disposable, stainless steel acupuncture needles.

The British Blood Transfusion Service screening of potential blood donors enquires about acupuncture. If acupuncture has been performed by a registered medical practitioner, the donor is accepted. If acupuncture was administered by others, then the donor is asked to wait 6 months (135).

Acquired immune-deficiency syndrome
The United Kingdom government produced acquired immune-deficiency syndrome leaflets suggesting that acupuncture needles may transmit human immunodeficiency virus (136). However there is no definite evidence that acupuncture needles have caused human immunodeficiency virus transmission. The risk to the practitioner from needlestick injury when treating an human immunodeficiency virus positive patient may be more important. Jinsheng (137) states it is impossible to contract human immunodeficiency virus via acupuncture, but we suggest that the answer remains undetermined.

Medication
This was one area of risk in which we found surprisingly few reports of actual problems: that is the potential interaction between acupuncture and drug treatments. Bleeding in the anticoagulated patient (8) is one obvious way this can occur. Another important point to recognise is that acupuncture may potentiate drug treatments. Thus the patient who is stable on insulin or hypotensives may become unstable when a course of acupuncture is begun.

Summary

Table 2

<table>
<thead>
<tr>
<th>CONTRAINDICATIONS OF ACUPUNCTURE</th>
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<tbody>
<tr>
<td>CONTRAINDICATION</td>
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<tr>
<td>Anticoagulation (except most superficial acupuncture)</td>
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<tr>
<td>Prosthetic and damaged cardiac valves (press needles only)</td>
</tr>
<tr>
<td>Pacemaker (electroacupuncture only)</td>
</tr>
<tr>
<td>CAUTION</td>
</tr>
<tr>
<td>Acupuncture points on thorax (practitioner should know the anatomy of the pleural)</td>
</tr>
<tr>
<td>Metal allergy</td>
</tr>
<tr>
<td>Immunosuppression (note acupuncture may be valuable to people with lowered immunity. Use scrupulous aseptic technique, with gloves)</td>
</tr>
<tr>
<td>PRECAUTION</td>
</tr>
<tr>
<td>Sterile disposable needles</td>
</tr>
<tr>
<td>Aseptic technique</td>
</tr>
<tr>
<td>Lie patient down during treatment</td>
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<tr>
<td>Driving (warn patients not to drive after first treatment, or allow a recovery period)</td>
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</table>

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We conclude that acupuncture is a safe technique when administered in the correct way. The serious complications reported in the past may easily be prevented by straightforward precautions, which we summarise in Table 2. We would expect, for example, no further reports of hepatitis B to arise now that sterile, disposable needles are available and in widespread use. Similarly, our awareness of the dangers of retained needles should preclude the kind of problems seen in Japan, where the okibari technique has been popular in the past.

The questions about acupuncture's efficacy are less simple. Meta analyses (138-141) of randomised, controlled, acupuncture studies have questioned the efficacy of acupuncture. Its analgesic effect is recognised in pain clinics, but it is much more widely used in general practice for a wide range of disorders such as dysmenorrhoea, irritable bowel syndrome, migraine, anxiety, addiction, asthma, psoriasis and many others. More work needs to be done to validate these claims. At least the workers researching these areas may be reassured they are not exposing their subjects to unnecessary risks.

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