Apparent Adverse Outcome of Acupuncture

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Alternative and complementary medical care are becoming increasingly popular in the United States, although many patients continue to consult mainstream physicians as well. As a result, physicians are seeing an increasing number of interactions between alternative treatments and their own medical practices. Many alternative and complementary forms of medicine are not studied in a scientific or evidence-based manner, frequently making the interaction and its extent difficult to determine. The case reported here is an example of that difficulty.

Case Report

A previously healthy 33-year-old man complained to his physician of multiple areas of erythema and swelling and was admitted to the hospital. Approximately 2 weeks earlier, the patient had begun to experience hip pain after a hockey game. He visited a local urgent care facility, a muscle strain was diagnosed, and he was given a prescription for a nonsteroidal anti-inflammatory (NSAID) medication. Although the urgent care physician recorded a fever in the patient's chart, he neither mentioned it to the patient nor addressed it clinically. When the pain did not improve, the patient consulted an acupuncturist on the advice of a friend and received acupuncture therapy to hips, legs, and feet. The patient observed that the skin was not cleaned before needle insertion. Because the pain did not improve, instead, it began to get worse, the patient saw his regular physician, who prescribed NSAIDs and acetaminophen-hydrocodone (Vicodin). His pain continued to worsen with walking, and ultimately he required crutches. Four days before admission he accidentally fell from a chair and had immediate pain in his right shoulder and elbow. Later that day he developed subjective fevers and night sweats. Two days before admission he began vomiting. The vomiting, fevers, and night sweats continued until the day of admission.

The patient had an unremarkable medical and family history. He had traveled from Los Angeles to Las Vegas approximately 3 weeks before admission, 1 week before the onset of symptoms. His sexual history was notable only for receiving oral sex at the time of his trip to Las Vegas. He denied any intravenous drug use or recent dental procedures.

On the day of admission, areas of erythema and induration were noted on his right forearm and shoulder as well as his right foot. There were no visible needle marks or other wounds. He had moderately limited range of motion of his right shoulder, and there were no fluctuant areas in either right upper or lower extremity. He was febrile, 101.8°F (38.8°C), and had mild scleral icterus. At the time of admission, an examiner noted a grade 1/6 midsystolic heart murmur. Other examiners, however, were unable to confirm the murmur. He had no splinter hemorrhages.

After his admission, blood cultures were ordered, and the right shoulder was aspirated in an attempt to identify the infecting pathogen. The aspiration attempt yielded no fluid. He was presumed to have a disseminated gonococcal infection, and antibiotics were started accordingly. A transthoracic echocardiogram showed no evidence of endocarditis. Four of four blood cultures grew *Staphylococcus aureus*. A bone scan showed increased activity at the pubic symphysis and right metatarsals. Two days after admission he began to have melenic stools, and his hematocrit began to fall, reaching a nadir of 22.0%. The patient had an upper endoscopic examination for presumed NSAID-induced gastric ulcer, but none was found. The gastrointestinal bleeding was therefore attributed to a septic embolus. A transesophageal echocardiogram showed a large vegetation on the aortic valve. The remainder of the patient's hospital course was unremarkable, and he was released to home with a peripherally inserted central catheter. After 6 weeks of oxacillin therapy, he made a full recovery.

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Discussion

Acupuncture is a form of medical treatment that dates back to about 1000 BC. In the broadest terms, it involves insertion and manipulation of needles in an attempt to alter the flow of Qi (or Chi) energy through lines of the body known as meridians. In theory this alteration in energy flow has an effect on all aspects of health. The modern interpretation of this manipulation of Qi is that acupuncture works by stimulating nerve fibers and junctions.[1] Although fairly uncommon in the United States before Richard Nixon's visit to China in 1972, acupuncture has been rapidly gaining popularity,[2] partly as a result of the growing use of alternative and complementary medicine. Randomized, placebo-controlled studies have shown that acupuncture can be effective therapy for some conditions, most notably those involving chronic pain and nausea.[3] Studies of risks of acupuncture are fairly sparse but usually point to minor complications as the most common adverse outcomes, and to traumatic complications, such as pneumothorax, as the most serious adverse outcomes.[4–6] Previously reported infectious outcomes have most often been either viral (eg, hepatitis B) or minor (eg, local cellulitis).[7]

S aureus is a pathogen that can infect native heart valves. To do so, however, there must first be at least a transient bacteremia. This patient had no known risk factors for bacteremia—he had no recent dental procedures, no known previous infections, and no intravenous drug use. The only potential risk factor was the acupuncture treatment. It is notable that the procedure did not include cleaning the skin before needle insertion.

A review of the literature through MEDLINE and bibliographies of other relevant articles found 4 reports of endocarditis,[8–11] 5 reports of sepsis (four involving *S aureus*),[12–15] and 1 report of bilateral psoas abscess[16] related to acupuncture. Of the cases of endocarditis, one involved an indwelling metal stud in the ear of a patient with known valvular disease.[8] Another involved multiple indwelling needles in the ear of a patient with an artificial valve.[9] A third involved a single indwelling ear needle, as well as multiple vitamin injections in the ankles of a patient with multiple prosthetic valves.[10] All these cases involved acupuncture to the ears only. The fourth case was of a woman with multiple medical problems but no known valvular disease who was taking prednisolone and received acupuncture to the thigh, knee, and ankle.[11]

The current case differs from the previous ones in several ways: the patient received in-and-out needle treatment, whereas three of the four others had indwelling needles; the patient had needles inserted into the legs and feet rather than the ears; and perhaps most importantly, the patient had no history of valvular heart disease, steroid use, or any other predisposition to infection. Both this case and the discrepancies raise numerous questions.

The first and perhaps most important question is whether acupuncture can cause bacteremia. This question has yet to be answered satisfactorily through research. For obvious reasons, the answer could have wide-reaching implications for both the use and the advisability of acupuncture in various patient populations. Another question is whether cleaning the skin with an antiseptic solution would prevent this bacteremia. Considering that three of four previously reported cases of endocarditis occurred in patients who had known valvular disease, determining the incidence of bacteremia would also have implications for whether and when to recommend antibiotic prophylaxis.

Additionally, it is notable that three of four previously reported cases of endocarditis involved acupuncture to the ears. Many schools of acupuncture differ in ways that appear important when considering a potential cause of bacteremia. For instance, Japanese practitioners tend to insert needles superficially, whereas Chinese practitioners are more likely to insert the needle deeply.[3] It is highly likely that some acupuncture techniques are more likely than others to have adverse consequences. It is even possible the risk-benefit ratio of some types of acupuncture is so high that physicians should recommend against them entirely. Which specific techniques are the more dangerous remain to be determined, however.

As in many case reports, not one reported case was able to show conclusively a link between acupuncture and endocarditis. In one report the diagnosis of endocarditis was made on clinical grounds, in which an echocardiogram was negative and only one of eight cultures was positive.[8] Another patient had only a single acupuncture needle, but had had multiple vitamin injections.[10] In the case reported here, the patient was febrile before receiving acupuncture, although he had no other indication of infection at that time. Establishing the specific ini-

tial cause of an infection is far from trivial. Reports of serious or systemic bacterial infection associated with acupuncture are rare, but it is not known whether this rarity is a result of infrequent occurrence or a detection failure.

After the patient's symptoms resolved, he filed a lawsuit against the acupuncturist. He lost, largely because the urgent care facility documented the patient had a fever before he had acupuncture therapy. Neither the patient nor his treating physicians were aware of this fever until the lawsuit. The urgent care facility subsequently closed, making it impossible to obtain the exact temperature for this case report. A final issue raised by this case might be the extent to which the rules for legal certainty in a court of law can or should be applied to medical inferences.

Conclusion

Acupuncture has been practiced for about 3,000 years, and its popularity in the United States seems to be growing rapidly. The rules of evidence-based medicine are only now starting to be applied to acupuncture treatment, so little is known about its safety. Additionally, because the complexities within acupuncture are manifold, it is impossible to issue blanket statements about its dangers or safety. It appears, however, that in this case insertion of acupuncture needles led to bacterial endocarditis in a previously healthy young man. Considering the thousands of persons who receive acupuncture treatment every day, the implications of this potentially fatal complication are broad. It remains to be determined, however, whether insertion of needles seriously increases the risk of bacteremia, or whether this case is simply a confluence of events implicating acupuncture. As acupuncture becomes increasingly mainstream and additional evidence accrues, it is likely that we will learn more conclusively whether acupuncture can turn skin flora into a pathogen and what we can do to prevent it. For now, however, infectious complications of acupuncture represent a wide field for future study.

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