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The most common sites of organ punctures from acupuncture are the heart, lung, liver, kidney, gall bladder and bladder.

PNEUMOTHORAX AND HAEMOPNEUMOTHORAX

The most frequently reported severe traumatic accidents caused by acupuncture needles are pneumothorax, spinal cord injuries and hepatitis (Peuker & Gronemeyer 2001, Rotchford 2004). Of these, pneumothorax is the most common. White & Ernst cite a survey of 1100 Australian practitioners of TCM, which revealed that of a total of 3222 adverse events of acupuncture in their practices – most of which were minor – there were 64 cases of pneumothorax (White & Ernst 2001).

Though none of the cases reported in the Australian survey was fatal, people can die from pneumothorax (Brettel 1981). Dr Zhou Jianwei, of Chengdu University of TCM, collected 110 cases of pneumothorax reported between 1950 and 1994, of which five resulted in death – an incidence of 4.5% (Zhou 1995).

As Rotchford points out, the literature suggests acupuncture-related pneumothorax is rare or is only associated with incompetence. In my opinion, the number of cases is still significant enough to deserve detailed examination here.

Case study 2.1

In one case, a 31-year-old pregnant woman sought acupuncture treatment for asthma. The acupoints chosen were on her back, and as the needles were inserted she experienced severe pains in the lung region. Shortly after the treatment, the woman began to have difficulty in breathing, and her rate of respiration increased. She was admitted to hospital in severe respiratory distress, resulting from pneumothorax of both lungs. She recovered after treatment (Wright et al 1991).

Case study 2.2

A 26-year-old female complaining of pain in her right shoulder went for acupuncture. The acupuncturist chose, among other points, SI-13 for treatment. After the points had been marked, but before the needling, the patient moved her arm (Fig. 2.1). Therefore the sites marked on the skin no longer lined up with the proper acupoints. Because the scapula had been moved by the change in arm position, the lung was punctured by needling of SI-13.

Three hours after the treatment, the patient began feeling chest pressure and shortness of breath, as well as pain in the right side of the chest, which radiated to the upper back and which was aggravated by coughing. The woman went to hospital, and the attending physician found diminished respiratory sounds from the right lung, and that her trachea had shifted to the left. An X-ray showed the right lung had collapsed 30%, a clear picture of pneumothorax.

Treatment consisted of abstraction of 500 ml of air from the right pleural cavity, and a course of antibiotics and cough suppressant. Before her discharge from hospital a week later, an X-ray showed the patient's lung had returned to normal (Bairen 1987).

Case study 2.3

Another case of pneumothorax cited in reviews of adverse reactions after acupuncture involves a 29-year-old woman with back pain. Ten minutes after acupuncture treatment, she experienced breathing difficulties, and severe pain that radiated from the acupoint on her back to the front of the chest wall. The review doesn't specify which point, but it was likely one of the back shu points on the Bladder meridian. An X-ray revealed a 30–40% pneumothorax, which was successfully treated by the insertion of chest tubes (Mazal et al 1980).

Related acupoints

LU-1, LU-2
 ST-11, ST-12, ST-13, ST-14, ST-15, ST-16, ST-18, ST-19
 SP-17, SP-18, SP-19, SP-20, SP-21
 SI-12, SI-13, SI-14, SI-15
 BL-11 to BL-21, BL-41 to BL-50,
 KI-22, KI-23, KI-24, KI-25, KI-26, KI-27
 PC-1
 GB-21, GB-22, GB-23, GB-24, GB-25
 LIV-13, LIV-14
 LI-16, LI-17
 TB-15
 Ren-15, Ren-22
 Ex. Jing Bi or Bi Cong, Ex. Ding Chuan, Ex. Yi Shu or Wei Guan Xia Shu

Discussion of pneumothorax

It is a common misconception that the lungs are safely protected behind the clavicle and within the ribcage. In fact, the inner top corners of the lungs extend 2 to 3 cm above the clavicle, where they are close to the surface of the body (Figs 2.2, 2.3). They also lie close to the surface from the sixth intercostal

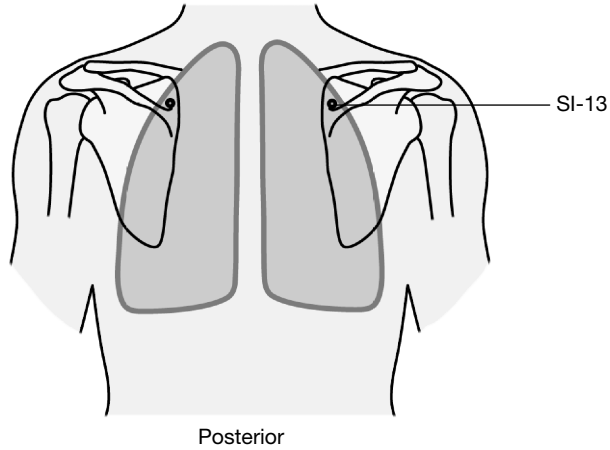


Figure 2.1a Take care the patient's position for point location remains unchanged when needling. When the patient's arm is down, there is no danger from needling SI-13 because the lung is protected by the scapula bone.

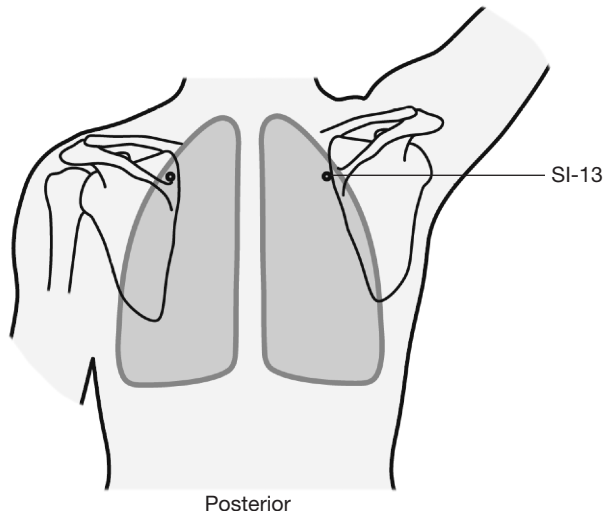


Figure 2.1b If the patient's arm is lifted, the scapula moves laterally, and a needle in SI-13 can puncture the pleura and cause pneumothorax.

space at the midclavicular line on inspiration, to the eighth intercostal space at the midaxillary line, and to the 11th intercostal space at the back during quiet respiration. Their posterior border runs along a line from where the scapular line meets the 10th rib, down to the 10th thoracic vertebra.

Whereas the upper part of the pleural cavity fits snugly against the lungs, its bottom section hangs lower than the lungs, by about the width of two ribs. Care must be taken to avoid lung puncture when needling points in all of these areas.

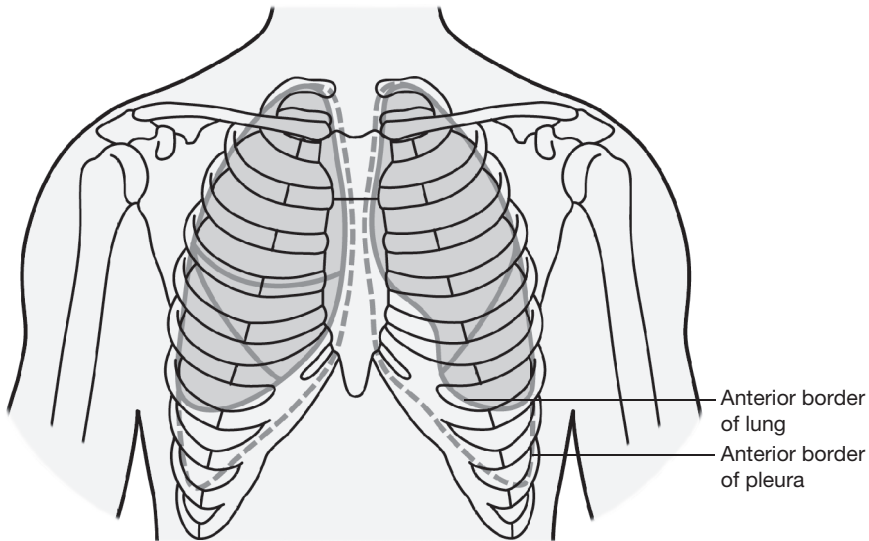


Figure 2.2 Anterior surface projection of the lungs.

The practitioner must also be careful when treating patients with emphysema, asthma or chronic bronchitis, because the lung and pleural cavity are likely to be enlarged as a result of these diseases. This increases the risk of puncture.

Pneumothorax is a pocket of air between the two layers of pleura. Incorrect needling of any of the related points can cause pneumothorax or haemo-pneumothorax (if blood vessels are damaged). In theory, pneumothorax can be

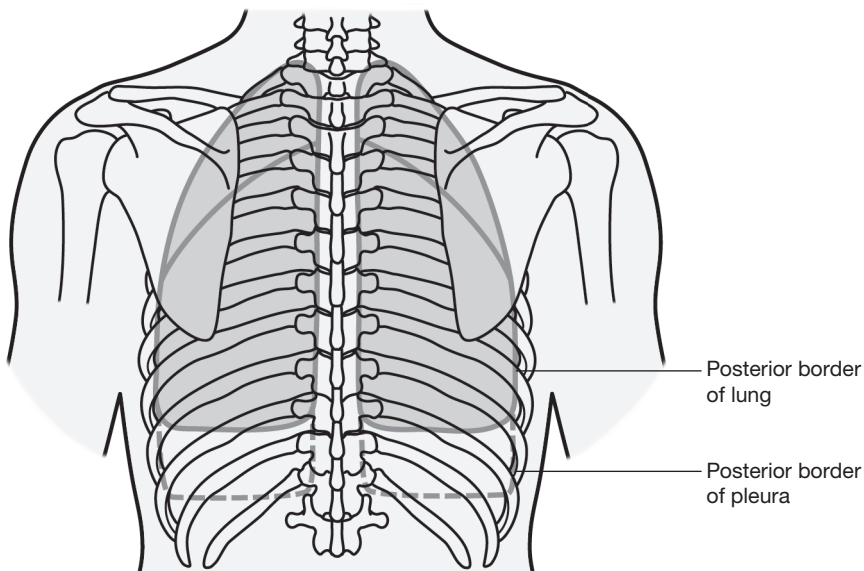


Figure 2.3 Posterior surface projection of the lungs.

caused by puncturing the parietal pleura – the outside layer – or the visceral pleura, which is the layer that lies next to the lung. When air is introduced between these two layers, it forms a pocket, and exerts pressure that can collapse the lung.

If death occurs, it is from airway blockage by blood and mucus. Usually, either the tracheal cartilage or the lung through the visceral pleura has been punctured. Blood leaks into the trachea or air rushes into the pleural cavity's negative space, collapsing the lung.

How can something as thin as an acupuncture needle cause pneumothorax? After all, the thick, elastic chest muscle would close off such a minuscule wound instantly. In fact, the air does not come from outside the body. In acupuncture, if a needle goes through the pleurae and punctures one of the alveoli, air will be sucked *from* the lung by the vacuum between the pleural layers.

As the apex of the lung extends higher than the clavicle, it is very easy to wound the top of the lung if the depth and angle of penetration are not correct when treating points just above the clavicle on either side of the trachea, such as GB-21, LI-16, LI-17 and TB-15.

When a person takes a breath, the expansion and contraction of the lungs are quite large movements. On a deep inhalation, the lower border of the lung can descend as much as the width of a rib. So if we needle BL-20, BL-21, BL-49 or BL-50 there is danger of puncturing the lung if the depth and angle of penetration are not correct. Also, when needling points between the scapula and the spine, if the patient moves his or her arm, the scapula will move laterally, exposing an area between the edge of the bone and the spine through which the lung can be reached. SI-12 and SI-13 are the risky points in this case.

When treating points on the back, side or front of the chest, ask the patient to avoid changing position or taking deep breaths. Also, during the time when the needle is retained in these points, if the patient has an uncontrollable urge to cough or sneeze, the practitioner needs to observe carefully, and either back off the needle's depth or even remove needles from the more sensitive areas to avoid causing a pneumothorax.

A pneumothorax may develop during a treatment or shortly thereafter. Symptoms include a sudden, sharp chest or back pain, a sudden dry, hacking cough and shortness of breath. If, after acupuncture, the patient complains of shoulder pain on the same side that was treated, and this pain was not there before acupuncture, practitioners should be alert to the possibility that this may be the only presenting symptom of a pneumothorax. Acupuncturists must also be aware that signs of a pneumothorax may not be evident for up to 24 hours after treatment, as it takes some time for the air pocket to develop between the pleural layers. The second case cited above is an example of this.

What to do in case of pneumothorax

A small pneumothorax usually does not require treatment. In most cases, the lung shrinks by less than 20% and the air is reabsorbed within a few days without intervention. In cases where more than 20% of the lung has collapsed, the patient needs to have the air suctioned out at the hospital, any fluids drained and antibiotics administered. A patient with a suspected pneumothorax with few or mild symptoms can be sent home to rest, with regular monitoring by the practitioner. However, if symptoms worsen over the course of 10–12 hours from their initial appearance, the patient should be sent to a physician or hospital emergency department for an X-ray.

Prevention of pneumothorax

Most cases of acupuncture-related pneumothorax could be prevented if the practitioner had had a better knowledge of anatomy. Always bear in mind where the borders of the pleurae and the lungs are situated, and the thickness of the soft tissue covering them. Before placing needles in these sensitive areas, check the depth and angle of insertion, and train yourself to become familiar with the 'feel' of different tissues touched by the needle. For example, when the needle touches the trachea under Ren-22, there will be a sense of elastic resistance, the patient may feel a tickle deep in the throat and have a desire to cough. If a needle touches a pulsing artery, you may be able to feel this movement. Withdraw the needle from these structures to avoid injuring the patient.

Electrical stimulation of these related points requires even more caution. Even when the angle and depth of the needle are correct, the weight of the electrical connector may subtly change the needle's direction. The pulses from the stimulator can also cause the needle to vibrate, which may change its position.

Be aware of which patients may be at greater risk for pneumothorax. These include smokers, people who are tall and slim, particularly males, patients with emphysema, patients who are or have been taking corticosteroids, patients with active cancer and anyone who has an abnormally small amount of body fat, for any reason.

About spontaneous pneumothorax

It is possible for a simple pneumothorax to occur spontaneously, when a part of a lung has been weakened by diving or high-altitude flying. People with pre-existing health problems, especially lung diseases such as those mentioned above, may develop a more serious but still spontaneous pneumothorax; the fact that it develops after acupuncture may simply be a coincidence. However, to be on the safe side with patients who are at greater risk, I substitute the following points for those on the back and the chest: LU-5, LU-7, LU-9, ST-36, KI-3, etc.

That way, if the patient develops a cough, chest pain or shortness of breath after acupuncture, I can be confident this situation has arisen sponta-

neously or is related to a cold or flu, and is not the result of an acupuncture accident.

In his review, Dr Rotchford (2004) concludes that one can see how easily a case of spontaneous pneumothorax could be blamed inaccurately on acupuncture. The odds of a spontaneous occurrence may be as high as what some literature reports as being associated with acupuncture. This would be especially true in a high-risk group such as tall male smokers.

However, Rotchford also points out that pneumothorax may be easily missed – and therefore underreported – by health practitioners who are not aware that shoulder pain may be the only presenting symptom.

HEART INJURY

An injury to the heart is of course one of the most serious accidents that can occur. Although these are quite rare, when they do occur, they are often fatal. Of four cases reviewed by Dr Zhou in China, all had died. Peuker & Gronemeyer (2001) cite eight cases of heart injury from acupuncture accidents written up in the scientific literature between 1965 and 2001; two of these patients died.

Heart injuries generally involve a puncture to a major cardiac blood vessel, or to the wall of the heart itself. These injuries then result in bleeding, causing shock, myocardial ischaemia, cardiac tamponade and heart failure. If the structure of the heart itself is damaged, functional problems such as arrhythmia, a reduction of cardiac output and pulmonary oedema will result. Considering the serious consequences of an accidental heart puncture, acupuncturists must treat related points with great caution, as we see in the following cases.

Case study 2.4

An 83-year-old emaciated female with no prior history of heart disease was given acupuncture, with a 3 cun needle inserted into the middle third of the sternum. Twenty minutes after treatment, the patient's heart rate slowed down and she lost consciousness. In hospital, echocardiography revealed cardiac tamponade with collapse of the right atrium and ventricle. Surgery was needed to stop the oozing of blood from a lesion in the anterior wall of the ventricle. The woman recovered and was discharged after 2 weeks (Kirchgatterer et al 2000).

Case study 2.5

The patient was a 19-year-old woman admitted to hospital for treatment of schizophrenia. Acupuncture was given once a day for 10 days, employing among others the points Ren-15 and LI-11. On the eighth treatment, as usual, the practitioner used a 2 cun needle to work on Ren-15, inserting it

perpendicular to the skin; once through the skin the needle was pushed 1 cm at an upward angle toward the sternum. Electrical stimulation was connected to these two points. The practitioner observed the needle in Ren-15 was moving – a sign that it was in contact with the heart muscle. After several minutes, the patient screamed, her head arched back, and she vomited. The needle was immediately removed. Cyanosis was evident on her face, and her heart and respiration stopped.

Open cardiac massage was used to restart breathing and heartbeat, but the patient remained in a coma until she died from a heart rupture and lung infection 20 days later. A review of this case concluded the needle in Ren-15 punctured the patient's heart (Liu Xinji 1981).

Case study 2.6

Another fatal case involved a 40-year-old woman who was being treated for fibromyalgia. An experienced practitioner inserted a needle into her sternum at the level of the fourth intercostal space. A few minutes later, the patient complained of chest pain and she was rushed to hospital, where efforts to resuscitate her were unsuccessful. A postmortem found blood in the pericardial cavity, and a perforation in the anterior wall of the right ventricle. An X-ray of the woman's chest showed a sternal foramen just at the level of the acupoint. This phenomenon will be discussed in more detail later in this section. (Halvorsen et al 1995).

Related acupoints

ST-15, ST-16, ST-17, ST-18, ST-19, ST-20, ST-21

SP-17, SP-18, SP-19, SP-20

KI-21, KI-22, KI-23, KI-24, KI-25

PC-1

LIV-14

Ren-14, Ren-15, Ren-16 (only if a patient has a congenital sternal foramen)

(Some points in this list are dangerous only if the patient has a disease that enlarges the heart. Others are only risky if the needle is placed at an incorrect angle. See discussion section for more detail on this issue.)

Discussion of heart injury

The heart is situated obliquely in the chest, with the attached end directed upward, backward and to the right (Fig. 2.4). The apex of the heart points downward, forward and to the left. The heart is placed behind the lower two-thirds of the sternum, and sits more to the left side of the chest cavity.

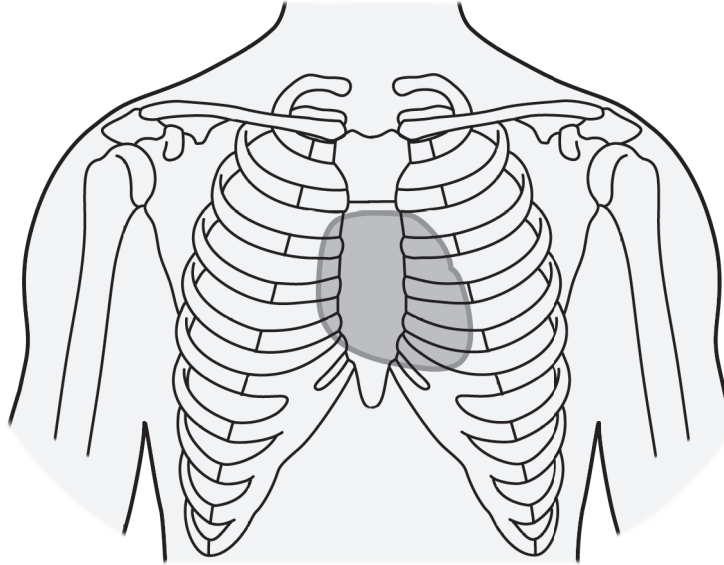


Figure 2.4 Surface projection of the heart.

For a more detailed projection, imagine the heart has four corners. Normally its surface projects to these coordinates. The left upper corner touches the inferior border of the left second costal cartilage, 1.2 cm left of the edge of the sternum. The left lower corner – the apex of the heart – is at the left fifth intercostal space, 1 to 2 cm left of the midclavicular line. The right upper corner is at the superior border of the right third costal cartilage, 1 cm from the right edge of the sternum, and the right lower corner is normally located at the right sixth sternocostal joint.

Most cases of heart injuries come from carelessness and lack of anatomical knowledge on the part of the practitioner. The two main errors are in the depth and the angle of needle insertion. The chest wall itself is not thick, so if the patient is small or thin, the distance from the skin surface to the heart is even shorter (Fig. 2.5).

'A postmortem showed that the distance from the skin to the posterior surface of the sternum was 13–19 mm.' (Rosted 2004).

The distance from the skin to the sternum, in general, is probably less than 1 cm. That is why using even a 1.5 cun needle can cause heart injury.

When we insert the needle, most of the time we use the fingers of our other hand to stretch, press and fix the skin to keep it in position for the needle. This further compresses the soft tissue, a point that the acupuncturist must take into account when gauging the proper depth, in order to reduce the risk of heart puncture.

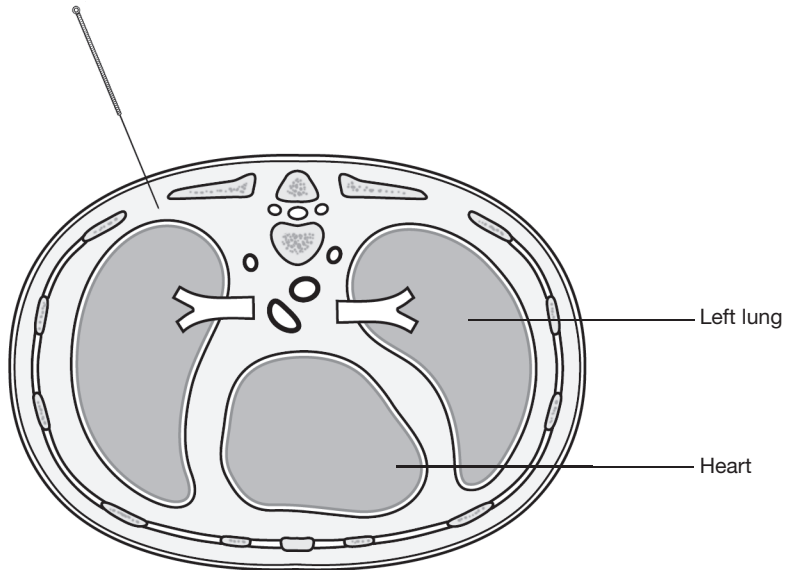


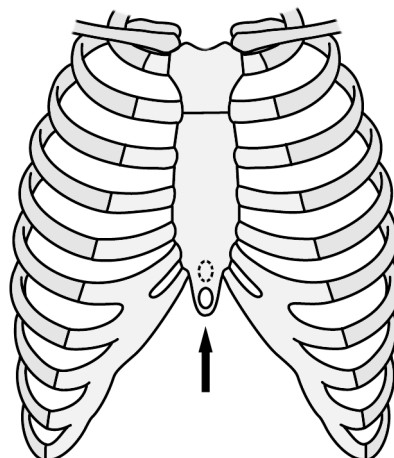
Figure 2.5 Transverse section of the thoracic cavity showing the lungs and heart. Theoretically, it is possible to injure the heart through the back, but it would take a serious degree of practitioner ignorance to do this, as the needle would have to perforate the pleural cavity and lungs first. Injury is more likely through the chest wall.

Also, when the heart itself is already diseased, resulting in enlargement or hydropericardium, this further increases the danger of injury from acupuncture.

There is risk, also, in treating patients with myocarditis or constrictive pericarditis or any other condition that results in degeneration, looseness, swelling, adhesions or calcification of the heart muscle itself. Any scar tissue or changes in the texture or strength of the heart muscle increases the risk of injury.

Some practitioners, when treating patients with chronic pain, like to use a technique of embedding needles in acupoints on the neck, back or chest. These may be special needles that look like a thumbtack, or may be ordinary acupuncture needles whose handles have been cut off. These are fixed in place with a piece of adhesive for a considerable period of time. The danger is that these needles may be forgotten and left in for far longer than is acceptable, and can eventually travel to organs such as the heart. Several cases of embedded or semipermanent needles working their way into the heart are reported in the literature (Kataota 1997).

Another potential hazard of which acupuncturists should become aware is the possibility that a patient has a congenital sternal foramen, as in the third case cited above (Fig. 2.6). The foramen is a congenital abnormality due to an incomplete fusion of the sternal plates.

Figure 2.6 Congenital sternal foramen.

According to Peuker & Gronemeyer (2001), it exists in 5–8% of the population. Other studies suggest as much as 9.6% of men and 4.3% of women have this condition (McCormick 1981). The foramen is usually located at the level of the fourth intercostal space (precisely at the acupoint Ren-17). A standard X-ray may not show it (Peuker & Gronemeyer 2001). The needle could easily pass through the connective tissue of the foramen and puncture the heart, causing cardiac tamponade.

Symptoms of heart injury are: severe chest pain, difficulty breathing, paleness, cyanosis in the lips, fainting, shock and convulsions. Blood pressure may drop suddenly, and respiration may cease. If puncture results in a cardiac tamponade, the patient may exhibit shortness of breath, dysphoria and a weak pulse; an X-ray may indicate enlargement of the heart. In addition, the patient may have symptoms of functional insufficiency, such as arrhythmia, chest distress and a cough that produces blood. The end result, if not treated immediately, will be heart failure.

What to do in case of heart injury

Heart punctures from acupuncture have resulted in death, in several reported cases. If a patient becomes pale, complains of chest pain and difficulty in breathing, and you see a needle rhythmically moving, stop treatment immediately, press on the point, closely watch your patient and call an ambulance.

As a practitioner, you must be alert to the signs of a heart injury, and if these symptoms occur it is your responsibility to call for medical assistance immediately so that the patient can be treated as soon as possible. Delayed treatment could be fatal. As we saw in the first case above, even when the patient requires surgery to repair the damage, successful recuperation is possible if treatment is begun promptly.

Prevention of heart injury

Questioning new patients about their medical history, especially of heart and lung problems, is imperative in prevention of serious injuries. If you suspect, or the patient reports, a heart condition you can percuss the chest to hear the heart's actual size. Many diseases, such as cardiomegaly, cardiac effusion and myocarditis, can cause the heart to enlarge. Some people are born with abnormal hearts.

Most people will not know if they have a sternal foramen, and it is not easy for the practitioner to detect. If a needle being inserted into the sternal area goes in more deeply than common sense would dictate, given that there is supposed to be a bone there, it is wise to suspect a foramen. It is a good idea, when treating areas around the heart, to use shorter needles – 0.5–1 cun – just to be on the safe side.

When we treat chest points that are located in the intercostal space, it is important to insert the needles at a slightly oblique angle, rather than perpendicular to the body surface. If the patient is less muscled or thinner, this angle should be even more horizontal, relative to the skin.

Always insert the needles in the direction toward the outside of the body, rather than toward the midline. Ensure that no more than 1 cm of the needle is penetrating under the skin.

When needling Ren-14 or Ren-15, the direction of insertion should be slightly oblique, and toward the navel, rather than toward the heart.

When treating back points, for instance on the Bladder meridian, the needle should be inserted obliquely either into the large muscle structures on either side of the spine (such as Ex. Hua Tuo Jia Ji points, which are needled into the muscles) or toward the outside of the body.

Always proceed slowly and gently when inserting the needle; observe the patient's reaction carefully and ask for feedback, especially when the person is lying face down. Do not try to force the needle to get the sensation of de qi. Wait for it to arrive. Some cases of injury have resulted from the practitioner vigorously stimulating and moving the needle to connect with de qi.

LIVER INJURY

The liver is soft and solid, but its surface is friable and easily lacerated. It is full of blood and bile. Therefore, if it is punctured with a needle, blood and bile will leak into the abdominal cavity, resulting in peritonitis. If this is not treated promptly, it is life threatening.

It should be pointed out that in normal circumstances most of the adult liver is shielded by the costal arch, except for the section under the xiphoid

Case study 2.7

A female, aged 40, came for acupuncture to relieve stomach aches after meals. The practitioner put needles into Ren-12, Ren-13 and Ren-15. During the whole treatment, the patient complained of feeling sharp internal pain under these three points. The acupuncturist removed the needles, which relieved the woman's discomfort. She went home and slept. In the middle of the night, the woman was awakened by pain in the upper abdomen, and went to hospital 12 hours after the acupuncture treatment. In addition to the pain, she had difficulty in breathing, nausea, thirst and restlessness. The examining physician observed facial pallor and distension of the abdomen. The stomach muscles were tight, with rebound tenderness. Fluid was extracted from the patient's abdominal cavity to check for the presence of bile and blood. Blood was found, and exploratory surgery was performed. It was found that the left lobe of the liver, directly under the above-mentioned acupoints, had been wounded and was bleeding. After a left lobectomy and further treatment during 50 days in hospital, the patient recovered (Feng 1965).

Related acupoints

When the following points are needled, the liver can be injured even if it is healthy:

Ren-14, Ren-15
ST-18, ST-19
GB-24
LIV-14.

When the liver is diseased it can be enlarged, which increases the danger of injury when needling these points:

Ren-11, Ren-12, Ren-13
ST-20, ST-21, ST-22, ST-23, ST-24, ST-25
GB-25, GB-26
LIV-13
SP-15, SP-16, SP-17, SP-21
KI-20, KI-21, KI-22.

process. Different diseases can cause the organ to enlarge, making it even more vulnerable to puncture where it is not protected by the ribs.

Discussion of liver injury

The liver is the largest gland in the body, and is located in the upper right part of the abdominal cavity. In a normal liver, the upper border runs from the seventh intercostal space on the right midaxillary line to the fifth intercostal

space on the midclavicular line, to the xiphosternal joint on the midline, to the fifth costal cartilage on the left midclavicular line (Fig. 2.7).

The lower border runs from the 11th intercostal space on the right mid-axillary line along the lower border of the costal arch to the costocartilage joint of the eighth and ninth ribs, to 3 cm directly below the xiphoid process, and on an oblique line up to the left, meeting the upper border at the fifth costal cartilage.

The surface projection of the liver varies according to different people's body shape and build. In a short and overweight person, the transverse diameter of the liver will be longer; the left corner of the organ can reach to the left midclavicle line and the entire organ lies higher in the body, so its lower edge may be even with the lower margin of the costal arch, which makes it difficult for the practitioner to feel where it is.

A tall, thin person, on the other hand, has a liver whose transverse diameter is very short. Its left corner may reach only as far as the body midline, or even less. And the liver's lower edge can drop down, where it is easy for the practitioner to locate and feel. This means that when your patient is tall and slender, the fact that the liver is more exposed and the person's muscle layer is thinner makes it easier to puncture the organ if you are not very careful about needle placement. When a tall, slim person comes through the clinic door, the experienced practitioner is immediately aware that extra care must be taken in accurately locating and needling near organs.

It is very difficult to injure the liver from needling acupuncture points in the back, because the left longitudinal sulcus, connective tissues such as ligaments

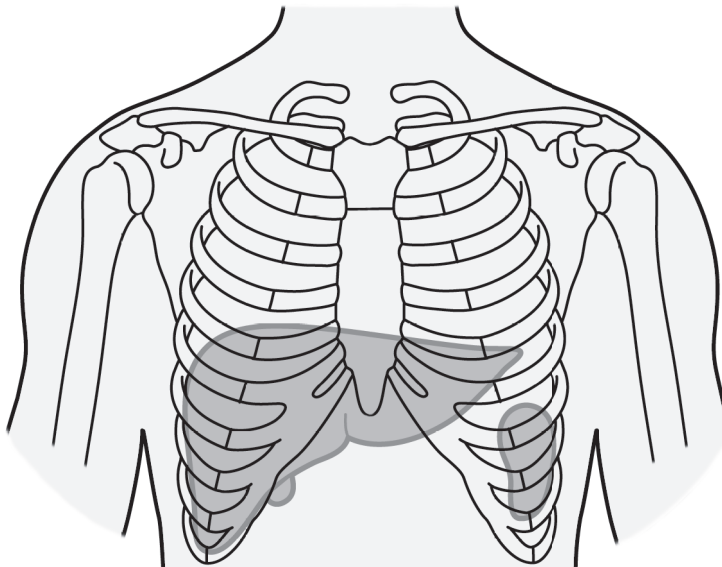


Figure 2.7 Surface projection of the liver (also including the gall bladder and spleen).

and the oesophagus lie between the back wall and the liver. Therefore, the risk comes mainly from points on the side of the body and the abdomen.

Normally, in an adult, the liver is palpable only 3 to 5 cm under the xiphoid process, the rest being covered by the costal arch. However, different diseases can cause the organ to enlarge. If we can feel the liver below the costal arch, it indicates some pathological swelling. In children, the liver is normally lower, so it is palpable below the costal arch.

The liver can actually move in a range of 2–3 cm, downward when the person is standing or inhaling, and upward when he or she is lying down or exhaling.

When the liver is swollen, the surface area in contact with the body surface is considerably larger than normal. This means that the danger of puncture is higher, and the number of acupuncture points that present a risk is greater. When the liver is enlarged, its top border can reach as high as the fourth and fifth intercostal space – the level of the diaphragm. Its lower border can extend to the umbilicus. Acupoints that are perfectly safe on a normal healthy person can become chancy when treating a patient with an enlarged liver.

Also, liver tissues whose texture has changed because of degeneration or cirrhosis are more vulnerable to injury. A liver hardened by cirrhosis can be ruptured if punctured by a needle.

Technique is important as well. Incorrect depth and direction on insertion of the needle, or repeated, aggressive lifting, thrusting or rotation after insertion can damage the liver. The case shown above is an example of what can occur when a needle is placed too deeply or manipulated too roughly. Since the liver is full of blood, the many liver injuries reported caused bleeding, resulting in haemorrhagic peritonitis. Signs of peritoneal irritation are stomach pain, abdominal wall resistance and rebound tenderness.

If, after acupuncture treatment on any of the vulnerable points, the patient experiences pain in the stomach, rigid abdominal muscles, rebound tenderness, facial pallor, nausea and vomiting, thirst, restlessness or shock, it is likely the liver has been punctured.

What to do in case of liver injury

If you suspect a liver injury, remove the needle, ask the patient to lie still, and send the patient to a physician or emergency ward. The doctors may do an X-ray, abdominal paracentesis or ultrasound examination. There may be bleeding that needs to be stopped, or the patient may require antibiotics.

Prevention of liver injury

If you have any suspicion your patient has a history of liver disease (including drug or alcohol abuse, or having lived or travelled where hepatitis risk is high)

it is advisable to take a detailed history, and to palpate the liver to check its size and position before treating any of the points listed above. If you believe your patient has cirrhosis or any enlargement of the liver, choose your treatment points with caution, avoiding those that may touch the projecting regions of the organ. There are points on the legs and arms that will serve the same treatment functions without the risk.

Prevent liver injury with careful needling regarding angle and depth. Focus carefully on the sensation of your fingers as you insert the needles to ensure the needles are penetrating only as far as the fatty and muscle tissues, and stop before you feel an empty space sensation.

Also, it is advisable to remove clothing over the patient's abdominal area so that you get a good view of the needle and can observe its direction, depth and any movement. It is best to put the patient in a supine position when points around the liver are being treated, so the abdominal muscles stay relaxed. This will avoid having the needle inadvertently change direction through muscle movement. Ask the patient to remain still, and to tell you if he or she needs to change position, so you can assist the movement and maintain careful observation of the needles.

When working on liver area points, always insert the needles at an oblique angle, pointing slightly downward along the line of the intercostal space, and toward the outside of the body. In very thin people, the angle of the needle relative to the body surface should be even smaller, but still pointed toward the patient's side, not toward the midline of the body.

GALL BLADDER INJURY

A review of the literature to date reveals reports of acupuncture-related injury to the gall bladder. When a perforation of the gall bladder occurs, bile leaks into the peritoneal cavity and leads to biliary peritonitis. This has serious consequences. In all of the eight cases of punctured gall bladder reported in Chinese literature from 1950 to the end of the 1980s, exploratory laparotomy was performed, and either cholecystectomy or cholecystostomy was needed. All the patients recovered, but biliary peritonitis is life threatening if not treated promptly.

Case study 2.8

A male, aged 60, sought treatment to relieve acid reflux and pain in the right upper stomach. The acupuncturist worked on LIV-14, GB-24 and ST-19. Immediately after treatment, the patient's pain worsened, and several hours later it had spread to the entire abdomen.

The following day, the patient went to hospital, exhibiting signs of shock: blood pressure was 60/40, temperature was 38.8 C and pulse was 120. The doctor

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subsequently extracted 5 ml of yellow fluid from the abdominal cavity – evidence of bile leakage and peritonitis. The patient required a blood transfusion and intravenous antibiotics, and a laparotomy was carried out, during which an additional 200 ml of bilious fluid was extracted from the abdominal cavity. The surgeon also discovered the liver was enlarged, approximately 5 cm (2") below the right costal arch. The gall bladder was inflamed and enlarged to the size of a tennis ball, and bile was leaking from a perforation on the fundus of this organ. The wound precisely matched the level of acupoint ST-19.

Three peanut-sized gallstones and one roundworm were discovered in the common bile duct. These were evidently the cause of the liver and gall bladder inflammation and the abdominal pain that had caused the patient to seek treatment in the first place. A cholecystectomy and T-drainage of the common bile duct were performed. The patient subsequently recovered (Chen et al 1963).

Related acupoints

ST-19, ST-20
GB-24
LIV-13, LIV-14

If the gall bladder is enlarged these points have a risk of injury:

ST-21
Ren-12, Ren-13, Ren-14.

Discussion of gall bladder injury

The gall bladder is a small pear-shaped organ that stores and concentrates bile, which flows from the liver through the bile ducts, hepatic duct and cystic duct. It is tucked under the right lobe of the liver, its fundus projecting outward from the larger organ's anterior border. Its surface touches the intersection of the lateral edge of the straight muscle of the abdomen, and the right intercostal arch immediately below the ninth costal cartilage. (See Fig. 2.7 for the surface projection of the gall bladder.)

Because the gall bladder lies deep within the body, protected by the liver, acupuncture can not normally harm it. However, the surface projection of the gall bladder's fundus is not always fixed. Depending on the elasticity of an individual's connective tissue, the fundus can in fact move up and down into a more vulnerable position. The size of the gall bladder also varies in size from one person to another. In a short and stout person, the gall bladder usually sits in a higher and more lateral position. In a thin, tall person, the organ will be lower and positioned closer to the midline. This means that when we are treating acupoints on the stomach and chest of a thin person we must take into

account not only the body's fat and muscle covering, but the position of the gall bladder, which may be unusually close to the centre of the body.

Also, if the gall bladder is enlarged because of inflammation, gallstones or a tumour, or is pushed out of its usual position by an enlarged liver, it becomes more vulnerable to puncture. It is quite common, in clinical practice, to feel a gall bladder that has been shifted out of place by hepatomegaly.

The case study cited above is an example of this. ST-19 is near the centre of the body, which should have been a safe couple of inches from the gall bladder's usual position. However, the enlargement of the man's organs had shifted his gall bladder, placing the fundus immediately under this acupoint.

The gall bladder's structure is under pressure from the liquid it contains, so that when the organ is punctured it automatically squirts bile into the peritoneal cavity. Bile consists of bile salts, electrolytes, pigments such as bilirubin, cholesterol and other fats. It is also responsible for the elimination of certain waste products from the body. The salts draw fluids from the inner layer of the peritoneum, causing profound irritation that can quickly result in shock and toxic septicæmia.

This condition must be quickly diagnosed and appropriately treated. Mild cases show symptoms within 10 minutes to 6 hours after treatment. Patients feel right upper abdominal pain, which radiates to the right shoulder and scapular region, and nausea, which may cause vomiting. Some cases of peritonitis have developed 1 to 2 days following a treatment; though the perforation itself was tiny, it leaked bile when the patient was digesting a meal. If the gall bladder was already inflamed, a perforation would be much more serious. The patient would experience severe abdominal pain, contraction of abdominal muscles, tachycardia, fast shallow breathing and fever from infection.

What to do in case of gall bladder injury

When you suspect the gall bladder has been injured, even mildly, advise the patient to refrain from eating for several hours. Consuming food will cause the gall bladder to contract, which would push bile into the digestive system and increase the danger of leakage. The patient should be asked to rest. There are some specific herbal medicines that are effective in this case. If the abdominal discomfort does not resolve itself or worsens after several hours of fasting and rest, the patient should be advised to seek medical attention.

Serious cases require hospital care, antibiotics and perhaps surgery to extract bile from the abdominal cavity.

Prevention of gall bladder injury

Prevent gall bladder injury by asking patients their history of abdominal and digestive disorders. If someone reports abdominal pain after eating such

fat-laden foods as fried eggs, this is a hint that the gall bladder is inflamed. Further evidence comes from a gentle palpation of the gall bladder's surface projection. This may cause the patient discomfort, so proceed carefully.

When needling points over the surface projection of the gall bladder, we normally perform a shallow insertion in an oblique direction toward the outside of the body. If you think a patient could have an enlarged gall bladder, control the depth of the needle. The maximum safe depth in such a case is dependent on the individual patient's physiology; if unsure, check your reference books for acceptable guidelines. For all patients, stimulation of the needles in these points should be very gentle. In the case of those with enlarged gall bladders, stimulation should be even more restricted, and the needles in this area should be retained for only a short time – no more than 15–20 minutes.

Also, if you suspect enlargement of the organ, it may be advisable to choose points on the patient's left side instead of the right, and select distal rather than local points. During all treatments, observe patients closely and ask them not to change position without your assistance. After the needles have been removed, and the patient is preparing to leave, continue to observe the patient, and ask how he or she is feeling. If you are at all concerned about the possibility of an injury, ask the patient to sit and wait for a few minutes to see whether any symptoms develop.

STOMACH INJURY

The stomach's tough covering makes it the least likely of all the organs to be injured. But because it moves around in the abdominal cavity, and its position is shallow relative to the body's surface, punctures are still possible. Twenty-one cases of acupuncture-related stomach injuries have been reported in the past two decades.

Case study 2.9

A 20-year-old male who felt stomach discomfort after he had been drinking alcohol and eating heavily went for acupuncture. Ten minutes after Ren-12 was needled, the patient felt a severe pain involving the entire abdomen. Ten hours after acupuncture, the young man was admitted to hospital. Doctors found his abdominal muscles rigid with rebound tenderness, and painful to the touch. The white blood cell count was elevated. An X-ray showed a pocket of air under the man's diaphragm. Diagnosis was stomach perforation and peritonitis. An exploratory laparotomy was performed, during which the surgeon found 100 ml of pus in the cavity, as well as a 4×4 cm² haematoma on the lesser curvature of the stomach and inflammation of the omenta. A perforation was found near the haematoma, covered by the great omentum. The perforation was repaired, pus and fluids were suctioned out, and drainage tubes inserted. The patient recovered (Xiao 1985).

Related acupoints

See Table 2.1.

When the stomach is full, or in the case of gastroptosis, these points may also be involved: Ren-9, ST-24, ST-25.

Table 2.1

Midline	Ren-13	Ren-12	Ren-11	Ren-10
0.5 cun lateral	KI-20	KI-19	KI-18	KI-17
2 cun lateral	ST-20	ST-21	ST-22	ST-23
4 cun lateral			SP-16	

Discussion of stomach injury

The stomach sits in the upper left quadrant of the peritoneal cavity, immediately behind the front wall of the abdomen and just below the diaphragm, which it touches along part of its length. It is a J-shaped pouch, with its large end directed upward, connected to the oesophagus, and its small end bent to the right, where it terminates at the beginning of the small intestine.

Similar to the gall bladder, the stomach is not a fixed organ but changes size and location according to the person's position and its state of fullness or emptiness. At midfullness, most of the stomach is located in the left hypochondrium with a small portion under the xiphoid process. If the stomach is overextended, it may reach the navel. Its position also varies with the person's age and body type.

The stomach wall itself undergoes peristalsis, contracting as it mixes and digests food. The stomach can move away from a gently probing needle, and even if a tiny perforation is made the stomach is able to contract and close off the wound. This is because the stomach wall consists of three layers of smooth muscle that run in different directions. When irritated, these muscle layers contract according to their direction, so a small hole will be covered over by this defensive mechanism. It is only when a large perforation or tear is made that there is an injury serious enough to cause a haemorrhage and leaking of stomach contents into the cavity, especially after the person has eaten a large meal. The case above is an example of the possible consequences of needling certain points on a patient with an extremely full stomach. The greater curvature of the stomach is normally on the same level as the 10th costal cartilage, and the third lumbar vertebra, but can move 5 cm up or down as it digests food. When the stomach is full, it can be distended downwards so that the greater curvature reaches as far as the umbilicus. This, of course, exposes more points of the Stomach and Ren meridians to potential injury.

Practitioners also need to be aware of the presence of pathological conditions such as gastritis, gastric ulcer, gastroptosis or gastric dilatation. These conditions will change the texture of the stomach wall itself, making it thinner, decreasing its elasticity and weakening its ability to contract. Ulcers or scar tissue also affect the texture and elasticity of the stomach wall, so that it cannot move easily away from a needle or contract to close off a wound.

Because the stomach seems to be well protected by fat and muscle layers, practitioners may be careless about the angle and depth of needle insertion, and too vigorous in stimulation of the needles. You will choose a perpendicular or oblique angle depending on the patient's body type, but you must ensure the needle does not go beyond the stomach muscle and into the cavity. One author reports a single case in which four perforations occurred because the angle, depth and stimulation of a needle were excessive. Each time this incompetent practitioner lifted and thrust the needle he was stimulating, the patient's stomach moved and another wound was inflicted.

What to do in case of stomach injury

If you suspect you have caused an injury, but the patient is not exhibiting any symptoms, ask the person to rest and consume a liquid diet for half a day. Minor discomfort should resolve itself after a couple of days of rest; this could still be related to the patient's original complaint. However, watch for any symptoms of stomach pain, fever or chills, which could be signs of infection. If these occur or worsen, the patient should be sent for medical treatment.

In the case of a serious puncture, within 10 to 20 minutes after treatment the patient will develop extreme pain and vomiting (food sometimes mixed with blood); the abdominal muscles will tighten and guard the area. X-rays will show air below the diaphragm; an operation will be necessary.

Prevention of stomach injury

Before treating stomach points, ask whether the patient has a stomach ulcer, stomach cancer, chronic gastritis, or has eaten a large meal within the past couple of hours. Ulcers are very common. If the answer to any of these questions is yes, be careful in treating local points.

In order to ascertain the correct depth of insertion, and whether to place the needles at a perpendicular or oblique angle, have the patient lie down comfortably face upwards. With your fingers, take a pinch test of the patient's belly fat. If the patient has more muscle than fat on the abdomen, oblique needle placement is best. If there is more fat than muscle, perpendicular needling is fine.

Use the amount of fat in the pinch test as a guide to depth as well. If, for example, the roll of fat is an inch thick between my fingers, I will insert the

needle no more than 1.25 cm (half an inch) deep if I'm placing it on the perpendicular angle, and no more than 1.7 cm (two-thirds of an inch) deep if insertion is oblique.

Practitioners want to be sure that the needle stays in the abdominal wall, which includes the layers of skin, fat, muscle and peritoneum. As the fat layer is generally the thickest of these, the pinch test is a good guide to safe insertion depth. This technique is also a useful guide to determining safe depth over any of the major organs – especially liver and intestine – that are accessible through the abdominal wall.

Prevent stomach injury by retaining needles within the abdominal wall, stopping insertion before you feel the empty space that is the peritoneal cavity. If you sense this empty space, withdraw the needle.

INTESTINAL INJURY

Reports of intestinal injury from acupuncture are rare. Two authors who collected statistics on this found 17 and 19 cases respectively (some of which overlapped). In all reported cases, severe complications, including secondary peritonitis, resulted from intestinal content flowing into the peritoneal cavity. Two of these were fatal. One was a case of ileum perforation followed by toxæmia. In the second, the ileum and transverse colon were punctured leading to toxic shock and multiorgan failure.

Case study 2.10

A 38-year-old female had acupuncture to relieve abdominal pain in the umbilical area. After treatment, the pain became worse and the patient began vomiting. She went to hospital about 12 hours after the treatment. The examining physician found signs of peritoneal irritation: guarding and rebound tenderness of the abdomen, and gurgling sounds. An X-ray indicated free air under the diaphragm, and multiple levels of fluid in the intestine.

Diagnosis was an intestinal obstruction and gastroduodenal perforation, with general peritonitis. Surgery was performed, during which a 180° clockwise twist was found at the end of the ileum. The torsion – the cause of the woman's original abdominal pain – had caused a ballooning of a section of the intestine, which was dark red in colour.

The surgeon removed the kink in the ileum and returned it to its proper position. He also found 12 acupuncture marks in the jejunum and ileum, five of which were perforations sufficiently deep to allow intestinal contents to bubble from them. Each of these holes was surgically repaired, and the patient subsequently recovered (Zhao 1978).

Related acupoints

All Stomach, Spleen, Kidney, Gall Bladder, Ren and Extra points located on the anterior of the body below the diaphragm and above the pelvis.

We should be especially careful when needling the following points, because of their location and because they are so frequently used:

ST-21, ST-25, ST-30

Ren-4

SP-13, SP-15.

Discussion of intestinal injury

The small intestine, consisting of the duodenum, jejunum and ileum, is the site where digestion is completed and nutrients are absorbed. It is the portion of the gastrointestinal tract between the pylori sphincter of the stomach and the ileocaecal valve opening into the large intestine. The whole small intestine is positioned in the central and lower portions of the abdominal cavity (Fig. 2.8).

Generally, the jejunum lies more to the left of the navel, and the ileum under the umbilicus and into the right lower abdomen. The diameter of the jejunum is larger and thicker than that of the ileum. The small intestine, except for the duodenum, is supported by mesentery, an apron of connective tissue.

It is important for acupuncturists to understand this portion of the anatomy. Although the attachment of the fan-shaped mesentery to the intestine generally prevents the intestine from becoming twisted or kinked, it also can prevent the intestine from moving away from a probing needle. However, if the intestines are diseased already, there is a twisting or obstruction, or if needle insertion is aggressive, injury is possible.

The small intestine is approximately 2.5 cm wide and 3 m. long in a living person. (It is interesting to note that it is twice as long in a cadaver, when all its muscles are fully relaxed; this is an indication of the strength of muscle activity in the digestive system.) As acupuncturists we must keep in mind that its designation as 'small' is relative only to the large intestine; in reality it takes up a significant amount of space and can therefore be punctured if we are careless in our needle insertion.

The large intestine connects to the bottom end of the ileum, in the lower right section of the abdominal cavity. It consists of the caecum, colon, rectum and anal canal. The colon itself is subdivided into ascending, transverse, descending and sigmoid portions. The large intestine is about 6.5 cm in diameter and 1.5 m long, and a part of the mesentery called the mesocolon supports it along the rear abdominal wall. While the large intestine has little part

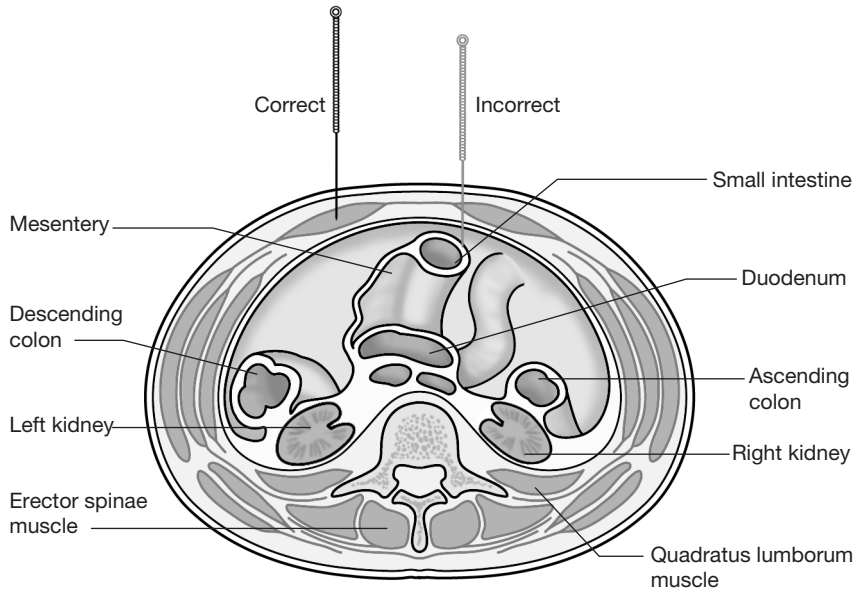


Figure 2.8 Transverse section of the body between the levels of L-3 and L-4. The correct depth of needle placement is in the muscle and fat layers of the abdominal wall. Excessive depth will pierce the intestine.

in digestion, it secretes mucus and absorbs water and electrolytes from the materials that pass into it from the small intestine. It also forms, stores and expels waste from the body – and therefore houses many bacteria.

Similar to the stomach, in a healthy intestine, when a gently probing needle touches the surface, there is enough room for the intestine to move out of the way. But if the intestine is diseased or inflamed by food poisoning, bacterial infection, or a twist or obstruction, its mobility is compromised, leaving it more open to puncture. Also, when there is pathology in the intestine, bacterial action will aerate its contents creating inner pressure and enlarging the intestine. This also inhibits the organ's ability to contract if a needle touches it. In the case of a puncture, the bacteria-laden contents of the intestine will leak out into the abdominal cavity.

Most cases of intestinal injury from acupuncture are caused by one or both of these two factors: the organ is enlarged, or the practitioner has placed a needle too deeply or stimulated it too roughly.

When the ileum of the small intestine is perforated, patients at first seem all right, but quickly develop chemical peritonitis from digestive fluids that have escaped into the abdominal cavity. When the large intestine is perforated, patients rapidly develop bacterial peritonitis, which is life threatening because the large intestine's contents contain toxic bacteria.

What to do in case of intestinal injury

In a mild case, where the surface of the intestine (especially the small intestine) has just been touched by a needle, the symptoms are often vague. There may be some abdominal discomfort, localised under the acupuncture site. The pain will not appear immediately, but develops gradually 4–6 hours after treatment as the leaking intestinal fluids begin to irritate the abdominal cavity and bacteria start to grow. Sometimes it takes as much as 24 hours before the patient experiences abdominal pain, so it can be difficult to make the link between the symptoms and the treatment.

If your patient reports these symptoms to you, and you know you have used acupoints in the intestinal area, suggest that the patient see a physician and let the doctor know that acupuncture may be a factor. Otherwise the patient may have to undergo a huge battery of unnecessary tests.

If you suspect you have accidentally punctured the intestine, instruct the patient to remain in a semireclined position supported by pillows. This will reduce the leakage of waste matter into the cavity. The patient may consume a small amount of liquid, but no solid food. Transport the patient to a hospital, where blood tests and an X-ray will be performed and antibiotics prescribed. In a mild case, the patient should recover without surgery.

With a more serious wound, there will be pain spreading over the entire abdomen, nausea and vomiting, high fever, abdominal guarding and tightness, and air in the abdominal cavity (shown by X-ray). This requires immediate hospitalisation, antibiotics and surgery.

Prevention of intestinal injury

Prevent intestinal injury by obtaining thorough medical histories from your patients. If someone comes for treatment of a stomach ache that has recently arisen and is not chronic, and you suspect the presence of some intestinal pathology, it may be advisable to suggest the patient be checked by a physician first. In the case history above we can see the danger of treating abdominal pain without having a clear idea whether pre-existing disease contraindicates acupuncture. Practitioners should make sure that the patient does not have an acute abdomen – in other words a condition that requires surgery – such as appendicitis or a twisted bowel.

Timing is the key factor in judging whether to treat patients or send them for medical assessment. If abdominal discomfort is acute and has come on suddenly or during a short time, it is best for the patient to seek a medical diagnosis before treating with acupuncture.

If, after having considered these factors, you feel acupuncture would still be helpful, avoid needling abdominal areas around the intestine, and treat

points on legs and arms instead. If you see that the patient has scar tissue on the stomach, be alert to the possibility that previous surgery has left adhesions that have glued the intestine to the abdominal wall. This means the intestine will be unable to move away from a needle. Avoid needling on, or even near, scar tissue.

As always when working around vulnerable areas, use gentle technique and be sure the patient doesn't make large or abrupt movements during treatment. In such a sensitive area, leave the needle in for no more than 15 minutes to avoid causing discomfort to the patient. Observe to be sure the patient's movements have not changed the angle or even the depth of the needle. Bending the knees, for instance, can drive an abdominal needle right through the muscle and into an organ.

Use the 'pinch test' to appraise the thickness of the abdominal fat and muscle layers before treating (Fig. 2.9). Place the needle at a depth that is no more than half the distance between your two fingers, and tune in to the sensation to make sure you are not entering 'empty space', in other words into the abdominal cavity. When needling abdominal points, always bear in mind the presence of vital organs and the risk of injury. Awareness prevents accidents.

It is generally best when treating abdominal points to have the patient lie face up rather than on one side, so the intestines don't slosh over to the lower side and move into a risky position. If you must use back points during the same treatment, I recommend dealing with the abdominal points first, then removing these needles and having the patient turn on one side for treatment of the back points.

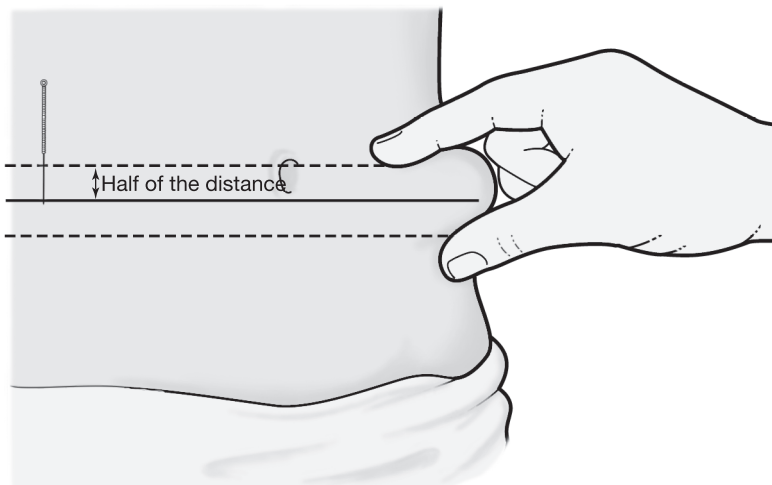


Figure 2.9 Ascertaining the thickness of abdominal fat and muscle for safe needle placement.

SPLEEN INJURY

The spleen is a very spongy, soft and vulnerable organ in the abdominal cavity. Its pulp contains a great deal of blood for such a small structure, and many vessels run through it. A ruptured or punctured spleen generally results in haemorrhagic shock, followed by secondary peritonitis from the irritation to surrounding tissues from seeping blood.

Case study 2.11

A 35-year-old male had been experiencing vague pain in the left upper abdominal region for 6 months. Over 3 days, the pain worsened, and was accompanied by nausea and vomiting. The patient sought acupuncture treatment. The acupuncturist chose the points SP-16, ST-21 and ST-22, and left the needles in place for 10 minutes. After the needles had been removed, the patient complained the pain in the left upper stomach was worse, and had spread to the entire abdomen. He had also developed severe bloating of the abdomen, thirst, nervousness and shortness of breath. The patient had a history of malaria in childhood.

After the acupuncture treatment, the man was admitted to hospital. An examination found the abdominal muscles to be tender, rigid and distended, and percussion of the area indicated fluid in the abdomen. The patient was rushed into surgery, where an inch-long (2.5 cm) laceration was discovered on his spleen. Nine hundred millilitres of blood were suctioned from the abdominal cavity, and a splenectomy was performed.

Analysis of this case suggests three major factors contributed to this accident. First, the man's bout of malaria had left his spleen enlarged to a point far below the ribcage, so that its surface was directly beneath ST-21. Secondly, the needle was placed too deeply. Then, when the patient took a breath, the needle scratched the spleen causing severe blood loss (Wang et al 1996).

Related acupoints

Left side: ST-21, SP-16, LIV-13, GB-25.

If the spleen is enlarged, the following points can also be involved:

Left side: ST-19, ST-20, SP-15.

Discussion of spleen injury

The spleen is a gland that assists other organs in producing lymphocytes, filtering the blood and destroying old red blood cells. Normally an adult's spleen is the same size as the palm of the hand. It is located posterior and lateral to the stomach, below the diaphragm in the left hypochondrium, covered by the ninth, 10th and 11th ribs (see Fig. 2.7 for surface projection of spleen).

Because it is so well protected, the spleen should be difficult to puncture unless it is enlarged. However, it moves up and down in a range of 2–3 cm with the diaphragm's motion during respiration, and as the stomach expands and contracts with the volume of stomach contents.

There are no acupuncture points on the surface projection of the spleen, but left-side GB-25 and LIV-13 are close to its lower border, so if the needle is inserted incorrectly at an upward angle there is a risk of puncture.

Splenomegaly presents the greatest risk of injury from acupuncture. Many diseases can cause the spleen to enlarge; these include infections such as hepatitis, syphilis, typhoid fever and tuberculosis, various anaemias, blood cancers such as leukaemia, inflammatory diseases, liver ailments such as cirrhosis, cysts and some parasites.

When splenomegaly occurs, the spleen becomes brittle and huge, and its borders may push up the diaphragm, move the stomach outward and even reach the ileum. This makes the spleen accessible through acupuncture points that are normally a safe distance away. In all reported spleen injuries, the organ has been enlarged by 1.5 to 2 times its normal size.

One kind of injury is a tension haematoma, in which the slow bleeding is contained underneath the spleen's capsule. Initially, the patient may not show any sign of injury other than mild distension or discomfort. Two days to 1 week later, the haematoma ruptures, resulting in intraperitoneal haemorrhage.

Symptoms are severe pain, abdominal distension, nausea and vomiting, abdominal guarding and tightness, pallor, thirst, weak pulse, a falling blood pressure and shock. This is a life-threatening medical emergency that calls for immediate blood transfusion and surgery.

What to do in case of spleen injury

If you think your needle has touched the patient's spleen, stop the treatment and remove all the needles. Check pulse and blood pressure several times. If any of the symptoms listed above are present, have the patient transported immediately to a hospital emergency ward. Even if symptoms are mild or vague, or you think the needle just touched the organ briefly before it was withdrawn, you may suggest the patient be examined just to be sure.

Even when the patient has not developed enough symptoms to result in admission to hospital, we still need to bear in mind the possibility of a slow-leaking tension haematoma. At that point, the patient will be monitored by a medical doctor, but the acupuncturist also has a responsibility to ascertain whether any further symptoms have developed and if so, advise the patient to seek medical treatment.

In the case of a rupture, a splenectomy and prophylactic antibiotics are indicated. The spleen is not considered a vital organ in adults. In an infant, it is crucial for the production of red blood cells.

Prevention of spleen injury

Prevent an injury to the spleen by knowing what can cause splenomegaly and asking patients about their history.

Because the enlarged spleen lies next to the stomach and may press against it, the patient may complain of acid reflux, or feel full after eating a small amount or even without having eaten. There may be abdominal pain in the area of the spleen.

Palpate the area to check whether the spleen is enlarged. Keep needles within the abdominal wall. If you sense an empty sensation or elastic resistance below, back off. Needles should also be backed off or even removed if the patient develops a sudden spasmodic cough. This applies to treatment points anywhere on the torso, not just over the spleen.

Watch for three signs of medical emergency: pallor, thirst and pain.

KIDNEY INJURY

Kidney injuries from acupuncture are very uncommon, though not unheard of. Points on the lower back are used daily in a huge variety of treatment situations, but because the muscles in that area tend to be thick it takes a fair degree of incompetence on the part of the practitioner to penetrate right through to the kidney. An author in China has collected only five cases of acupuncture-related kidney injury, and no fatalities have been reported in the literature so far as I have been able to determine. However, if an injury does occur, the consequences are always serious and will require surgery to repair the puncture and stop bleeding, or in severe cases may result in a nephrectomy.

Discussion of kidney injury

In regard to surface projections, the left kidney is 3.5 to 10 cm to the left of the midline of the back, from the lower border of T11 vertebra down to the lower border of L2 vertebra (Fig. 2.10). (The left 12th rib obliquely crosses the

Case study 2.12

A male, 37 years old, sought acupuncture for stomach ache. During the first treatment, the practitioner employed points on the arms and the chest only. For the second and third treatments, points on the kidney region of lower back were added – two needles on the left side and two on the right. Three days after the third treatment, a swelling came up under the muscle in the right kidney region. The patient went to hospital, where he was diagnosed with perinephritis – an inflammation of the tissue surrounding the kidney. A course of antibiotics successfully reduced the inflammation.

However, 10 days later, the patient developed a fever, low back pain and frequent urination, and was admitted to hospital. Antibiotics were continued, and an extraction of 200 ml of blood from the kidney was performed, followed by exploratory surgery. The surgeon found 100 ml of old blood in the renal subcapsular area. A golf-ball-sized lump inside the kidney itself also contained some blood. The bleeding had originated from a fissure in the kidney that was 6–8 cm long, 0.5–1 cm deep. The bleeding had stopped before the surgery, but adhesions had already formed, so the surgeon had to remove the patient's right kidney. The patient recovered (Liu 1957).

Related acupoints

BL-20 – 24, BL-48 – 52
 GB-25
 Ex. Yao Yan

centre of the left kidney; this is a useful starting point for palpation.) The right kidney is usually half a vertebra lower than the left kidney (1 to 2 cm lower) and situated 3.5 to 10 cm to the right of the midline of the back. In most cases the kidney moves, although only by a distance of one vertebra, according to respiration and body position.

The kidneys are called retroperitoneal organs because they lie outside the abdominal cavity, behind the peritoneum. The kidneys lie closest to the back; very seldom is a kidney injured from the front of the body because the stomach, intestines and liver are in the way. The only real likelihood of kidney injury is through the back in areas where the organ projects closer to the surface.

The points that are the most vulnerable to injury, and which therefore we need to be most cautious about, are: BL-49, BL-50, BL-51 and BL-52. Another group somewhat less risky is: BL-20–24, GB-25 and Ex. Yao Yan. In all cases, excessive depth of needling is the major risk factor.

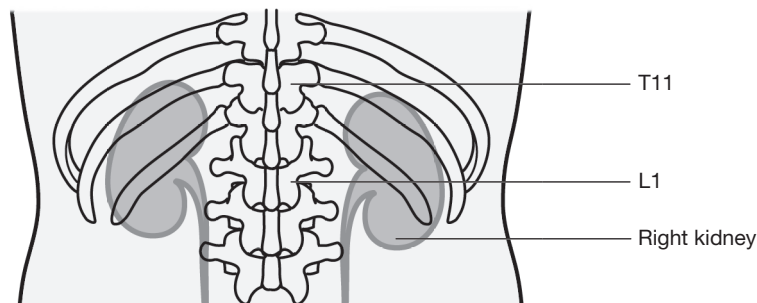


Figure 2.10 Posterior surface projection of the kidneys.

Acupuncturists have to pay attention to the thickness of the fatty and muscular tissue over the kidneys when plotting treatment points. The safe depth of needling in the lower back has, in fact, been suggested by a group of Chinese doctors who performed CT scans on more than 100 patients. Their report says that, regardless of whether the person was overweight or underweight, 'the three acupoints with the least thick fatty tissue in the lower back were: BL-48, BL-49 and BL-50. The tissues averaged a mean depth of 1.01, 1.00 and 1.02 cm respectively. Additionally, the three acupoints with the least thick muscle tissue were BL-48, BL-49 and BL-51, with tissues averaging a mean depth of 3.18, 3.18 and 3.10 cm respectively. The variation in thickness of muscle tissue was much greater than that of fatty tissue' (Lin et al 1998).

We can see that the two groups of points, in fatty and muscle tissue, overlap in BL-48 and BL-49. This warns us that in dealing with these two points we consistently have less room for error before reaching the kidney. BL-50 and BL-51 are slightly different: BL-50 tends to have less fatty tissue around it and BL-51 on average has less muscle tissue. Over all, however, these four points in the kidney region present a risk of injury from mistakes in depth or direction of needle insertion.

Detailed knowledge of anatomy guides practice in choosing the appropriate needle size. Taken together, the fatty tissue and muscle tissue add up to a maximum of 4.02 cm or 40.2 mm. in thickness in most people. Therefore it is important to keep in mind the length of the needles used. Two cun needles are 50 mm long; 3 cun needles measure 75 mm. Normally, for points in the lower back, we use a 2–3 cun needle, depending on the patient's individual body type. So if a 2 cun needle has been inserted to its maximum length, perpendicular to the body, it is likely to have gone through the fat and muscle and possibly have punctured or lacerated the kidney.

What to do in case of kidney injury

If the needles touch only the superficial capsule of the kidney or the shallow part of the renal parenchyma layer surrounding the organ, only small vessels will be ruptured, without a more serious injury to the renal calices or renal

pelvis. A puncture to the small vessels would result in loss of only a microscopically detectable quantity of blood cells. Several days' rest should ensure the patient's full recovery. If the deeper, functional structures of the kidney, such as the calices or pelvis, are punctured, blood in the urine will be obvious to the naked eye.

A serious wound would cause leakage of urine into the layer between the kidney and the renal capsule, or even into the surrounding tissues. There may be bruising or swelling on the organ, and subsequent infection. The patient will have a high fever and exhibit symptoms of shock. This may be life threatening and requires immediate treatment.

Injuries may not be noticeable right away. In the case cited above, the blood-filled bruise did not appear until 3 days after the third treatment. If, several days to a week after acupuncture treatment, there is a swelling or pain in the needled area, be alert to the possibility of a kidney injury.

Symptoms of a minor injury are slight backache, muscle rigidity, fatigue and microscopic haematuria. Recovery takes an average of 2 weeks, and may also call for a course of herbs with haemostatic properties, as well as antibiotics.

Severe injuries puncture the renal parenchyma causing haematoma underneath the capsule. Patients feel severe distending pain radiating to the shoulder above, tight lumbar muscles and pain upon touch. A palpable mass at the back may also be evident at the front, and there will be visible haematuria. Send the patient immediately to a physician or the emergency department. If treatment is begun without delay, it may be possible to avoid the need for surgical repair. As long as blood in the urine and the patient's temperature are improving over the course of a few days, surgery may not be necessary. However, leakage of urine or the development of an infection may make an operation inevitable.

Prevention of kidney injury

For the points on the first line of the bladder meridian (BL-20–BL-24) the direction of needle insertion should be oblique and toward the spine, and depth should not be excessive (Fig. 2.11). The spine in this area is well protected by muscle. For the points on the second line of the bladder meridian (BL-48–BL-52) we point the needles in the opposite direction, toward the outside edge of the body, also at an oblique angle and not too deeply.

The average safe depth, depending on the patient's body type, would be 1–1.5 cm at an oblique angle. There may be exceptions when a patient is very heavy or very thin.

Pay attention to the needle sensation (heavy and firm in muscle, then empty, then the elastic resistance of a kidney) and be prepared to back off the needle's depth if you sense empty space – a good principle in general.

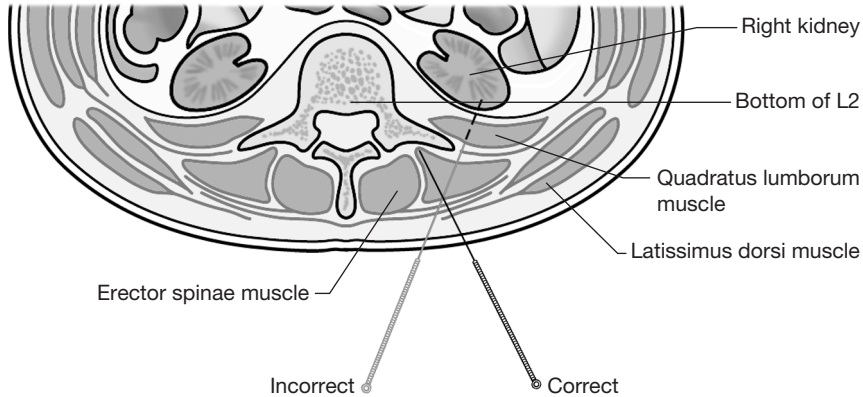


Figure 2.11 Correct and incorrect needling direction for points on the first line of the Bladder meridian. This diagram shows the transverse section of the body between the levels of L2 and L3. To avoid puncturing a kidney, the needle should be angled in the direction of the spine.

Be aware of abnormal kidney locations, as in a 'floating kidney'. Also called a 'moveable kidney', or in medical language ectopia, this is a birth defect in the formation or position of the kidney. The organ could be punctured accidentally when the acupuncturist is not aware that it is situated in a place where it is not normally found. A clue to this possibility would be that such a patient would probably have chronic back pain and chronic urinary system infections. The only way of finding out for sure that a patient has a floating kidney is with an X-ray or ultrasound; therefore this situation must be dealt with by a physician.

BLADDER INJURY

There are very few reports of injuries to the urinary bladder from acupuncture. But because the lower abdomen has many acupoints that are used on a daily basis in treating a wide variety of conditions, there are some factors that deserve attention.

Case study 2.13

An adult male was admitted to hospital for chronic glomerular nephritis. After a week of Western medicine treatment, the patient began to suffer from intermittent gastrointestinal pain. Acupuncture treatment was performed on Ren-4 and Ren-6, followed by moxa treatment.

The gastrointestinal discomfort responded well to this treatment. However, later that night, the patient began to feel nausea and a continuous pain that was localised in centre of the lower abdomen. Physicians examined him and,

knowing that he had had acupuncture earlier in the day, decided to perform a laparotomy. This procedure revealed a perforation at the base of the bladder, coinciding with the level of the acupoint Ren-4. The surgeon also observed a slow, drop-by-drop leakage of urine into the peritoneal cavity. The puncture was surgically repaired and the patient went on to a full recovery (Wang et al 1996).

Related acupoints

Ren-2, Ren-3, Ren-4
 KI-11, KI-12, KI-13
 ST-28, ST-29, ST-30

Discussion of bladder injury

The urinary bladder is located just behind the pubic symphysis, and in front of the rectum. When empty, it sits in front of the parietal peritoneum, and has the shape of an inverted pyramid. As the bladder fills with urine, its superior surface enlarges and bulges upward into the peritoneal cavity, and the organ becomes more ovoid in shape.

The peritoneum is like a sheath covering the apex of the bladder. Along the midline, these structures are essentially 'glued' together by connective tissue. On the lateral parts of the bladder, the peritoneum is more like a loose covering over the organ. Therefore, when we are needling points on the Ren meridian along the body's centre line, the needle will encounter more resistance in the connection between the peritoneum and the bladder, even though this tissue is thin. In pushing the needle, there is danger of puncturing the bladder. In the lateral areas, on points on the kidney and stomach meridians, the tissue is looser and therefore easier to get through. The bladder can be punctured without our being aware of it.

Another factor of which acupuncturists must be aware is whether the patient's bladder is full or empty. As previously mentioned, a full bladder will be rounded and its apex distended upward into the abdominal cavity, sometimes almost to the level of the umbilicus. When the top of the bladder extends higher than the pubic bone, it becomes vulnerable to injury.

Additional caution is indicated when treating children. The apex of a child's bladder is normally higher than the pubic bone, whether empty or full. Also, children's bladders are always close to the abdominal wall, and there is little or no fat or muscle tissue to protect it. Parents often bring children to an acupuncture clinic for treatment of enuresis. Our primary treatment points for this condition are Ren-2–Ren-4, KI-11–KI-13, as well as SP-6. We must pay particular heed to needle depth and direction when treating children.

What to do in case of bladder injury

During treatment, if a patient is feeling a heavy, distending pain in the lower abdomen, you should suspect that a needle has touched the bladder. Remove the needle immediately. It may be that only the muscle and membrane have been injured and the bladder wall itself has not been perforated. Normally, a minor injury will resolve itself after a few days of rest.

A puncture of the bladder itself will cause bleeding, and leakage of urine into the peritoneal cavity. The toxic wastes contained in urine are irritating to the interior of the peritoneal cavity.

If urine leaks outside the peritoneum, into the surrounding perivesical space, pericystitis will develop. The patient will experience strong pain in the lower abdomen and a distending pain of the rectum and perineum.

Whether the perforation results in urinary seepage inside or outside the peritoneum, antibiotics will be necessary, and possibly surgery as well. Therefore the patient should be sent to a physician or hospital emergency ward as soon as possible. Signs of a perforated bladder are not immediately evident; it may take half an hour to several hours after treatment for symptoms to arise, depending on the rate of urinary diffusion.

Prevention of bladder injury

If you will be treating points in the lower abdomen, it is advisable to ask patients whether they have emptied their bladder recently, and, if they have not, to do so before treatment (Figs 2.12, 2.13). When needling this area, we must be especially careful to insert the needle in a controlled manner. Stimulation of the needle to reach de qi must also be more gentle than usual. The needle should be twirled within a small range of motion, and should not be lifted and thrust as we might do when treating other points. If care is taken

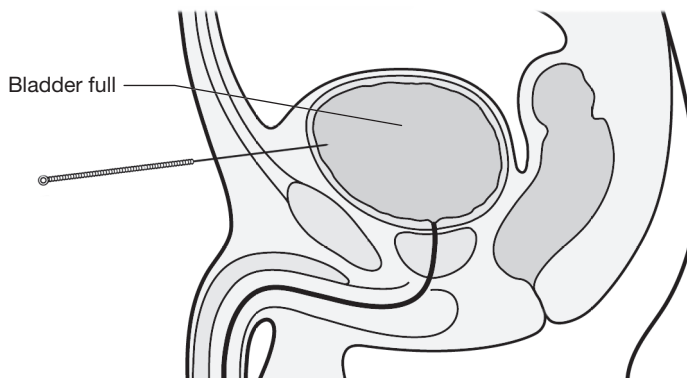


Figure 2.12 Position of needle when bladder is full.

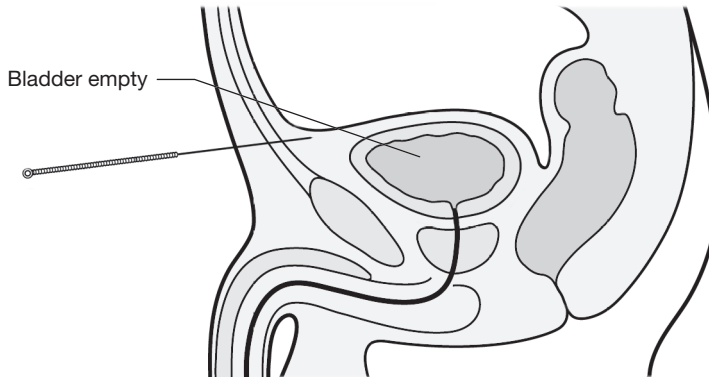


Figure 2.13 Position of needle when bladder is empty.

in manipulation of the needle, even if injury occurs it will be a small puncture and not a large hole or laceration.

In addition, needles should be retained in these points for only 10 minutes or so, because urine will continue to accumulate in the bladder during treatment. As the patient begins to feel an urgent need to urinate, restlessness and movement increase the possibility of puncture.

In many countries, acupuncture is a common and very effective treatment for patients suffering from retention of urine. This can occur after a stroke, postsurgically, as a result of irritation after a pelvic examination or as a side-effect of some medications. Paradoxically, having a full bladder makes it difficult to treat urinary retention! In addition to the cautions outlined above, it is important in this case to insert needles in these vulnerable points at an angle that is quite shallow relative to the surface of the body – generally no more than 30°.

This also applies when treating children, especially those less than 10 years of age. The angle of needle insertion should be closer to about 15° – so that the needle is almost lying flat. In older or larger children the angle should still be no more than 30°.

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