

## Pulmonary rehabilitation for perioperative spinal fusion: looking inside practical details

Dear Editor,

First we would like to congratulate Lee *et al.*<sup>1</sup> for their article “Pulmonary rehabilitation to decrease perioperative risks of spinal fusion for patients with neuromuscular scoliosis and low vital capacity”.

We read the article with great interest because it highlights the impact of controlled pulmonary rehabilitation for scoliosis operation. The authors demonstrated that the use of noninvasive intermittent positive pressure ventilation (NIPPV), air stacking, manually assisted coughing and mechanical insufflation-exsufflation can be used pre- and postoperatively in patients with FVC of <30%. However, we consider that there are some key aspects that should be taken into account for a proper clinical practical extrapolation.

First, as mentioned by the authors, they conducted a retrospective study of a clinical case series, which shows that there was a specific protocol; however, it could be difficult to select the techniques influencing directly the criteria for the therapeutic management of these patients, who show different therapeutic chest respiratory options mentioned.

Second, indications and criteria for NIPPV need to be better defined by the authors. These have been evaluated previously in studies evaluating the effects of NIPPV through evaluations of outcomes and incidences of postoperative pulmonary complications among patients with neuromuscular scoliosis flaccid for pulmonary support in the perioperative periods.<sup>2,3</sup> These studies demonstrated that patients who used NIPPV did not require tracheostomy, and pulmonary complications were higher when compared to non-use. The retrospective study by Lee *et al* does not allow a clear response of this aspect.<sup>1</sup> We consider that a rationale approach of NIPPV is necessary to avoid confounders factors, and that it has not been taken into account properly.<sup>4</sup>

However, pulmonary rehabilitation presents an important alternative in this population.<sup>5,6</sup> Further new research demonstrating the effectiveness of the different therapeutic approaches in this population should be encouraged.

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## Real-time sonoelastography findings in a patient with tennis leg: a promising technique in the assessment of muscle rupture

Dear Editor,

The rupture of the medial head of gastrocnemius muscle, also known as tennis leg (TL), is a relatively common sports injury.<sup>1</sup> Real-time sonoelastography (RTSE) has emerged as a novel and noninvasive imaging method that displays the stiffness of tissues under compression. RTSE has been successfully used for detecting pathological changes of various musculoskeletal tissues.<sup>2</sup> However, to the best of our knowledge, there are no previous reports of RTSE findings of TL. RTSE may improve the diagnostic accuracy of ultrasound (US) in muscle injuries. We would like to present RTSE findings of a 39-year-old male patient with TL.

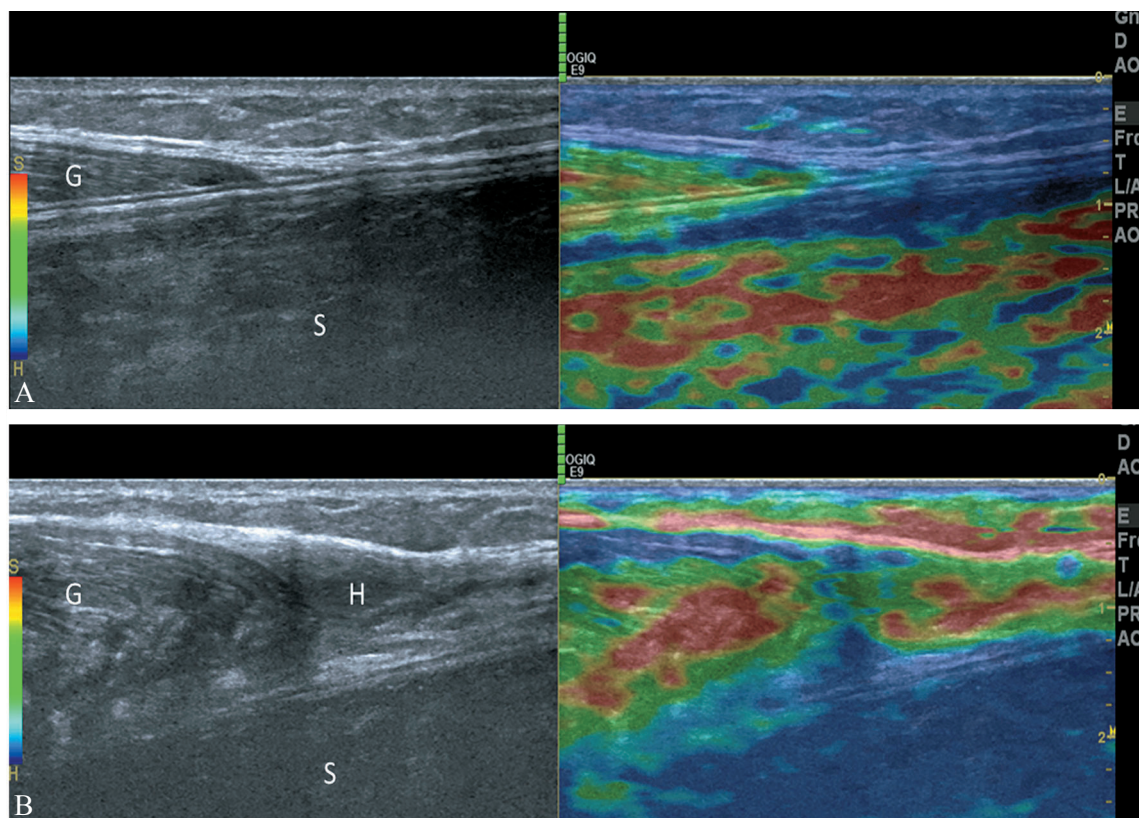


Figure 1.—A) 39-year-old man with a left sided tennis leg. On the left side B-mode sonography image and on the right side elastography image seen together. Real-time sonoelastography shows blue and green coded normal gastrocnemius (G) and soleus (S) fibers in the musculotendinous region. B) Real-time sonoelastography shows red and green coded ruptured gastrocnemius fibers (G) in the musculotendinous region. Hematoma (H) is also coded in red and green color. (G: gastrocnemius muscle; S: soleus muscle; H: hematoma; R: ruptured fibers).

A 39-year-old male experienced an instantaneous and intense sensation of having been struck on the back of the calf, while playing football as an amateur. He was starting a fast pivot with knee and ankle in flexion, when he experienced the pain. He was unable to bear weight on his affected left leg and quit the game. On physical examination, the range of motion of the ankle was in normal range but painful. There was no sensory loss. Deep tendon reflexes were preserved bilaterally. The left calf was tender, and there was swelling without calor. Homans sign and Thompson test were negative bilaterally. A subsequent US scan was performed with a high-resolution ultrasound device (Logiq E9, GE Healthcare, Milwaukee, WI, USA) equipped with an elastography-compatible 9-15-MHz matrix linear probe. The US scan confirmed a tear of gastrocnemius medial head at this site and demonstrated the presence of hematoma stripping the gastrocnemius away from the underlying soleus (Figure 1). RTSE showed green coded normal gastrocnemius fibers in the unaffected right leg and mostly red and green coded ruptured gastrocnemius fibers in the musculotendinous region of the affected left leg (Figure 1). Both the conventional US and RTSE examinations were performed on the first day of the injury when the patient applied the hospital. MRI of the left leg also documented the rupture of the medial

gastrocnemius at the musculotendinous junction (Figure 2). The patient was prescribed diclofenac sodium 150 mg/day for a week. He was advised to wear a stabilizing ankle orthosis. He was able to walk with bilateral axillary crutches during the first week. He started full-weight-bearing without assistive devices in the second week. Stretching and progressive strengthening exercises were prescribed. At the third month of the injury, he was symptom-free.

The mechanism of injury in tennis leg involves knee flexion with foot dorsiflexion during an abrupt pivot. The patient typically complains of acute onset of pain in the proximal calf accompanied with a feeling as if the calf has been kicked or struck by a ball or racket. The patient may also experience difficulty in ambulation, cramping, muscle weakness, ecchymosis, and significant swelling.<sup>3</sup> Deep vein thrombosis (DVT) should be included in differential diagnosis of patients especially with acute calf pain without findings in favor of muscle rupture like ecchymosis, calf asymmetry.

The early treatment of TL focuses on symptomatic relief, including rest, ice treatment, compression wrapping, and elevation to minimize swelling (RICE). Pharmacologic agents may be recommended to provide analgesia and reduce muscle spasm. Radiological studies play a significant role in the diagnosis of TL. Ultrasound is an efficient and inexpensive tool for diagnosing gastrocnemius

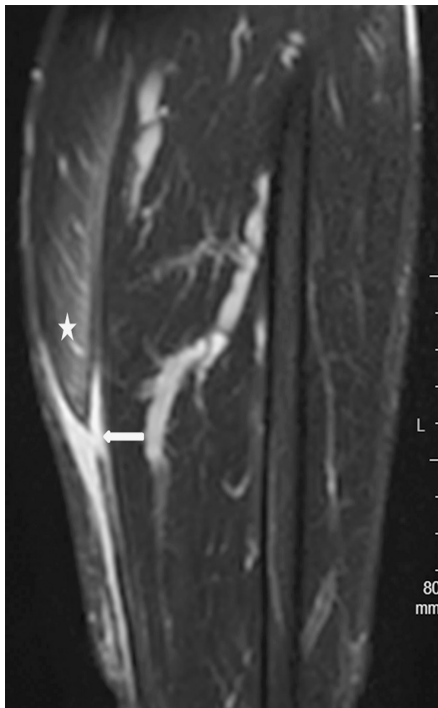


Figure 2.—A) Fat-saturated T2W coronal MR image demonstrating the rupture of the medial gastrocnemius musculotendinous junction (arrow) as retracted muscle fibers with edema (star).

injury. Furthermore, The US also may help to rule out DVT. Low-cost, portability, fast scan time, decreased artifact from metal hardware are among the other strengths of US<sup>3</sup>. However, given the operator dependency of conventional B-mode US, reported relatively low sensitivity and specificity in the evaluation of muscle rupture, and obtaining detailed visualization of soft tissues with MRI, MRI may also be recommended for assessment of TL in some instances.<sup>1</sup> Disruption of the normal fiber alignment at the musculotendinous junction, hematoma, and fluid collection between the gastrocnemius and soleus muscles are among the US findings of TL<sup>1</sup>. There are no reports of RTSE findings of muscle rupture in the literature.

Muscle tissue has a fibrillary structure in nature, and disruption of the anatomical integrity of muscle fibers causes a prominent and acute change in normal tonus and structural architecture of the muscle. Therefore, we hypothesized that RTSE, which assesses the tissue stiffness may be very helpful in documenting muscle rupture. As a common knowledge that soft tissues, just as fat, are coded mostly in red color and hard tissues, just as tendons are coded mostly in blue color. The RTSE images demonstrated mostly red and green coded areas at the region of ruptured muscle and mostly blue and green coded areas at the contralateral normal muscle. The US is a very convenient imaging tool for diagnosis, follow-up, and treatment of sports injuries.<sup>4</sup> RTSE may increase the diagnostic accuracy of conventional US and may reveal additional benefit on dynamic muscle imaging by supplying information about the elasticity of muscle tissue. The confirmation of diagnosis may decrease the duration and cost of the treatment.<sup>5</sup>

In conclusion, using RTSE in combination with the conventional US may improve the diagnostic accuracy of conventional US in muscle injuries. Further clinical studies investigating the potential benefits of RTSE imaging in muscle injuries are guaranteed.

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## Attitude, beliefs and knowledge of Iranian physiatrists toward evidence based medicine and its barriers. A cross-sectional study

Dear Editor,

Evidence based medicine (EBM) education has been included in many health committees and educational curriculums in devel-