RSNA Press Release

Minimally Invasive Technique Offers Lasting Relief for Carpal Tunnel Syndrome

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OAK BROOK, Ill. – A minimally invasive ultrasound-guided technique offers long-term relief for patients with carpal tunnel syndrome with fewer side effects than steroids, according to a new study published today in *Radiology*, a journal of the Radiological Society of North America (RSNA).

Carpal tunnel syndrome occurs when the median nerve, a major nerve that runs from the forearm through a narrow space in the wrist called the carpal tunnel, becomes squeezed or compressed. It is associated with repetitive motions of the wrist and hands that lead to numbness, tingling, weakness and pain. Research has shown that the condition affects roughly 5% to 10% of the general population over their lifetimes, and incidence is rising.

Corticosteroids injection, a common treatment to reduce swelling and relieve pressure on the nerve, has limitations.

“Traditional steroid injection for carpal tunnel syndrome often provides only temporary relief, thus requiring repeats of the procedure,” said study co-author Anupama Tandon, M.D., professor in the Department of Radiodiagnosis and Imaging at University College of Medical Sciences and Guru Teg Bahadur Hospital in Delhi, India. “Further, steroids carry risk of localized skin changes, fat thinning and tendon weakening.”

Nerve hydrodissection is a steroid-free alternative that involves careful injection of fluid around the affected nerve under ultrasound guidance to release the nerve from surrounding adhesions and improve its mobility. Hydrodissection is generally used in conjunction with steroid treatment, but little is known about its effectiveness as a standalone treatment.

To learn more, Dr. Tandon, study lead author Anindita Bose, M.D., assistant professor in the Department of Radiology at Mahatma Gandhi Medical College and Hospital in Jaipur, India, and colleagues performed a randomized control trial of 63 patients with confirmed carpal tunnel syndrome who had not responded to conventional treatment.

The researchers divided participants into three equal groups. Two groups underwent ultrasound-guided

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hydrodissection of the median nerve, with one group receiving normal saline alone and the other getting a combination of normal saline and corticosteroid. The third group received an ultrasound-guided corticosteroid injection alone.

The researchers assessed the patients clinically using standardized symptom, functional and pain scores. They also assessed the median nerve area on ultrasound at four weeks, 12 weeks and 24 weeks after treatment.

All three groups experienced significant improvement at four weeks post-treatment. However, the benefits of hydrodissection were sustained and continued to improve over the subsequent follow-up periods.

“At 12 weeks and 6 months, both hydrodissection groups demonstrated further improvement in clinical symptoms and function, whereas patients who received corticosteroid injection alone experienced a recurrence of the symptoms, suggesting that the initial benefit was short-lived,” Dr. Tandon said.

The addition of corticosteroids to the hydrodissection injectate did not provide a significant additional long-term benefit compared with saline hydrodissection alone.

The ultrasound findings supported the clinical results. The cross-sectional area of the median nerve decreased by approximately 43% to 45% following hydrodissection, compared with approximately 15% following corticosteroid injection alone, indicating a greater reduction in nerve swelling.

“Most of our patients had been suffering from carpal tunnel syndrome for months to years and did not get much relief despite trying various treatments like pain medications, splints, lifestyle modification and corticosteroids,” Dr. Tandon said. “It came as a pleasant surprise to find that a simple procedure of dissecting the median nerve under ultrasound guidance with normal saline provided them long-term relief.”

The procedure took only 15 minutes on average, and the patients tolerated it well. No significant immediate or delayed complications were observed. Questionnaire scores showed that the patients were highly satisfied with procedure. Its cost was low, no anesthesia or hospitalization was needed, and the patients were able to go back to work in an hour.

The findings point to a more prominent role for hydrodissection as a treatment for a condition that is increasing in prevalence around the world.

“Overall, the study suggests that ultrasound-guided saline hydrodissection is a safe, minimally invasive treatment that can provide sustained clinical and morphological improvement in patients with refractory carpal tunnel syndrome,” Dr. Tandon said. “Thus, hydrodissection merits to be a minimally invasive option for mild to moderate carpal tunnel syndrome and can defer and even alleviate the need for surgery.”

Future multicenter studies with larger cohorts and longer follow-up are warranted, the researchers said. They have already launched a study comparing the long-term effectiveness of different injectates in hydrodissection for carpal tunnel syndrome, such as dextrose versus saline.

“This trial features an extended follow-up period to track long-term patient outcomes and establish the true durability of the treatment,” Dr. Tandon said.

“Efficacy of US-guided Hydrodissection for Carpal Tunnel Syndrome: A Prospective Randomized Controlled Trial.” Collaborating with Drs. Tandon and Bose were Gopesh Mehrotra, M.D., Siddharth Maheshwari, M.D., and Ayush Khandelwal, M.D.

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For patient-friendly information on ultrasound, visit *RadiologyInfo.org*.

Images (JPG, TIF):

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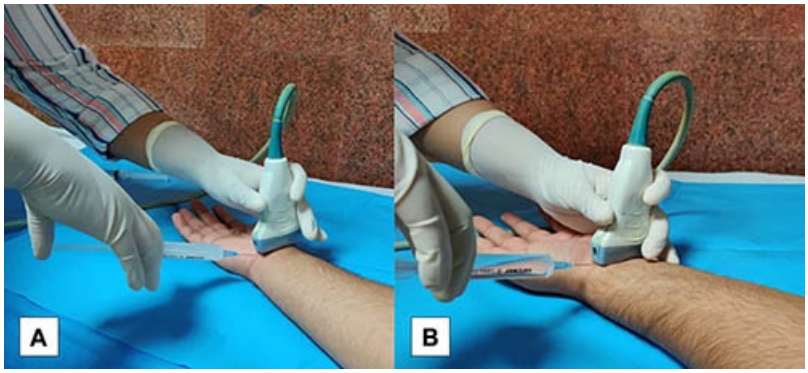


Figure 1. Photographs depict the in-plane technique of needle insertion for the US-guided hydrodissection procedure using the **(A)** ulnar approach in right wrist carpal tunnel syndrome (CTS) and the **(B)** radial approach in left wrist CTS.

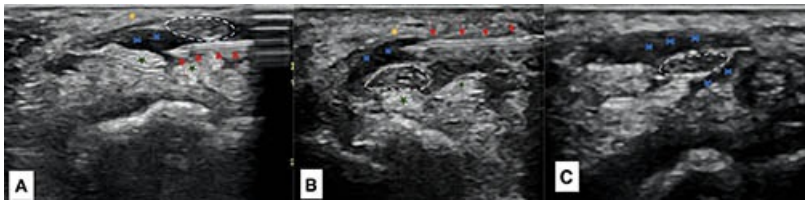


Figure 2. Ultrasound images depict the procedure of hydrodissection in a patient with carpal tunnel syndrome using an in-plane approach. **(A)** The needle is placed below the median nerve (white dashed oval) with fluid (blue × symbols) dissecting the nerve from the underlying flexor tendons (green stars). **(B)** The needle was placed above the median nerve with fluid dissecting the nerve away from the flexor retinaculum (yellow star). **(C)** Image at completion of procedure depicts the dissected median nerve with fluid all around. Red arrows indicate the needle position.

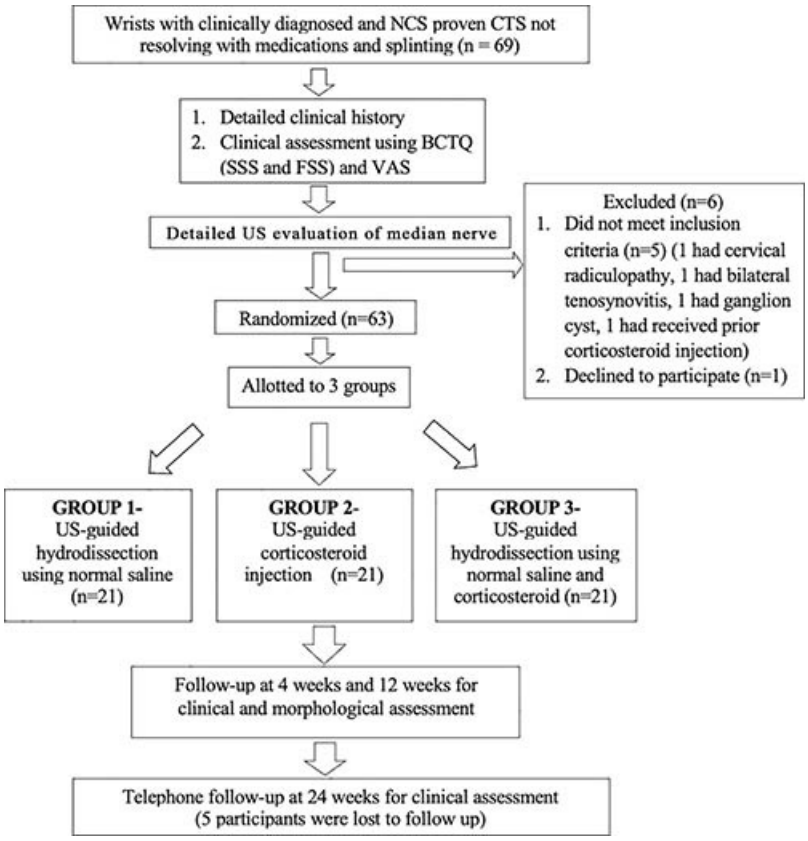


Figure 3. Study flow diagram. BCTQ = Boston Carpal Tunnel Questionnaire, CTS = carpal tunnel syndrome, FSS

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= Functional Status Scale, NCS = nerve conduction study, SSS = Symptom Severity Scale, VAS = Visual Analog Scale.

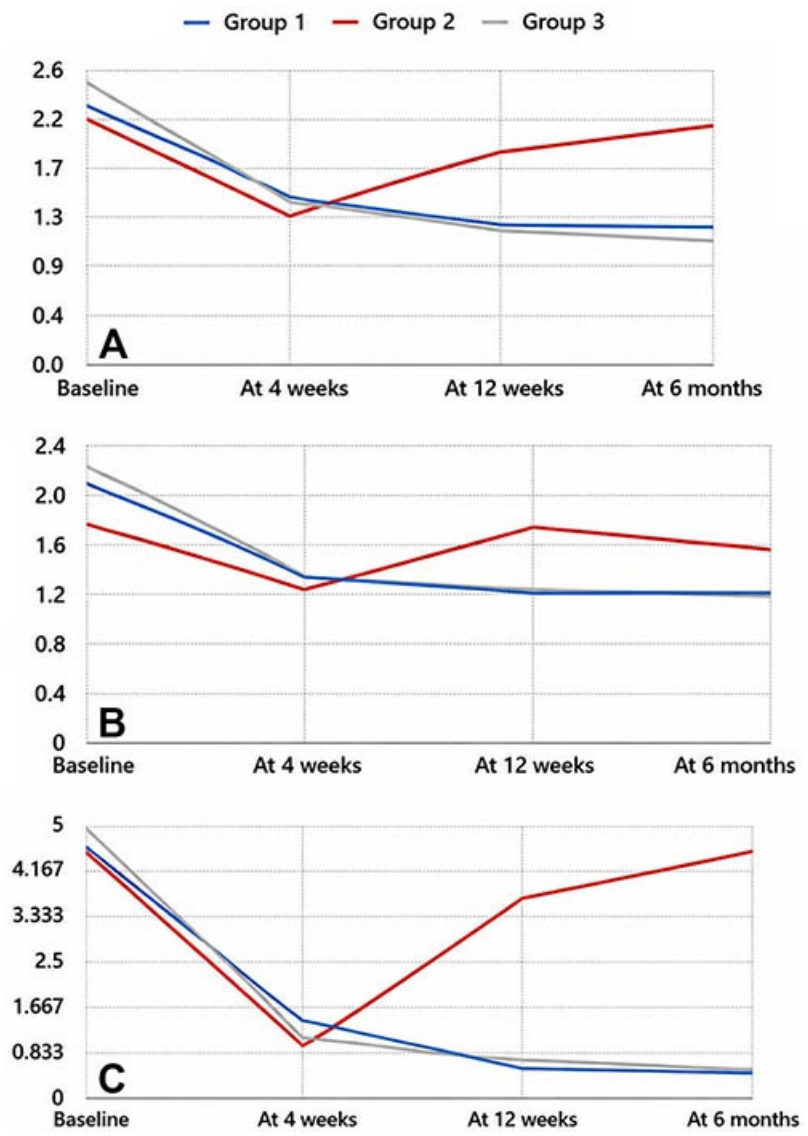
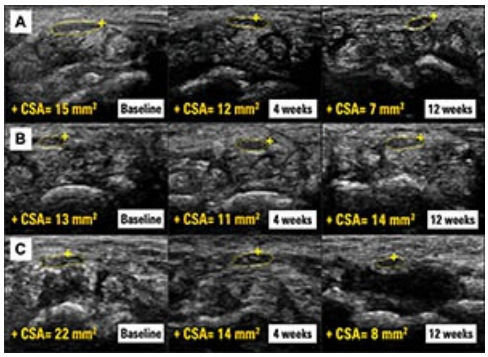
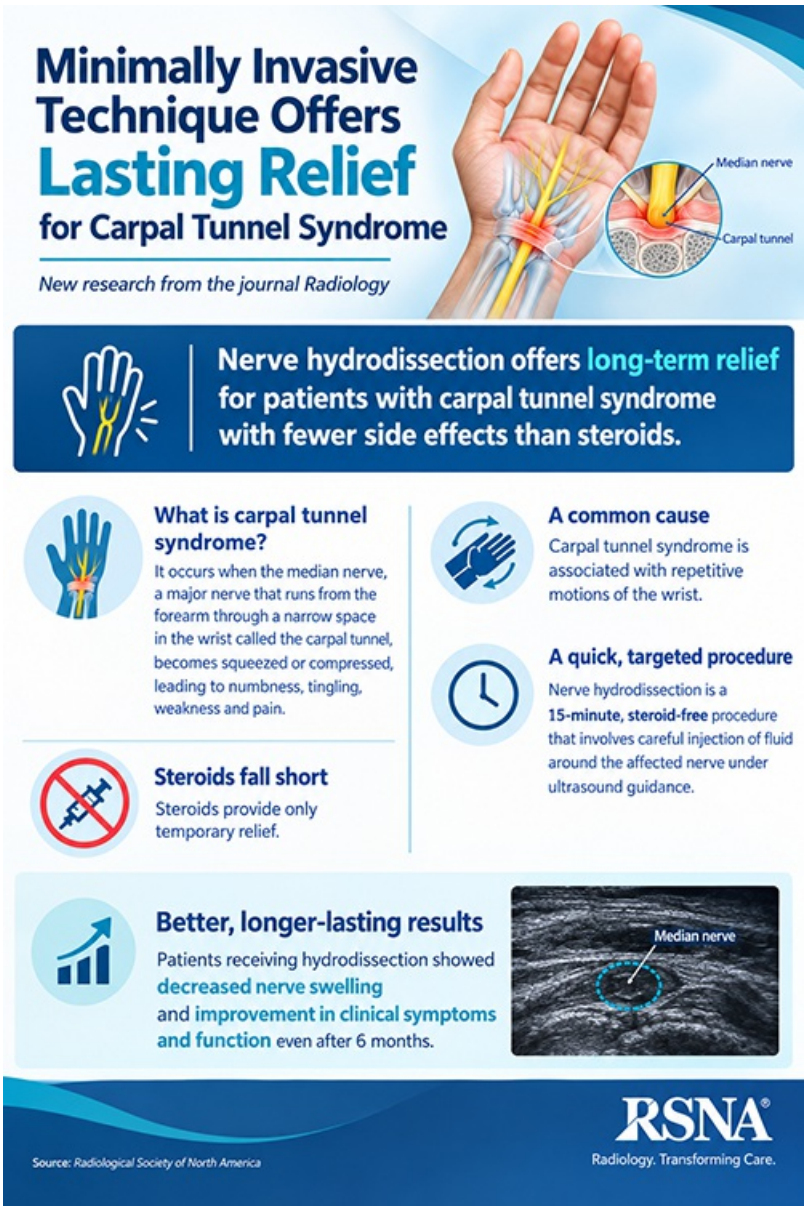


Figure 4. Group comparison of trend in **(A)** Boston Carpal Tunnel Questionnaire Symptom Severity Scale, **(B)** Functional Status Scale, and **(C)** Visual Analog Scale scores at different time points. Group 1 underwent US-guided hydrodissection with normal saline (NS), group 2 underwent US-guided corticosteroid injection alone, and group 3 underwent US-guided hydrodissection with NS plus corticosteroid. Clinical improvement was sustained in both hydrodissection groups, whereas participants treated with corticosteroid injection alone showed symptom recurrence after the initial response.



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Figure 5. Ultrasound images of the median nerve (yellow dashed oval) in participants with carpal tunnel syndrome who underwent US-guided interventions. Images show **(A)** hydrodissection with normal saline (NS) only in a 33-year-old female participant, **(B)** US-guided corticosteroid injection in a 35-year-old female participant, and **(C)** US-guided hydrodissection with NS and corticosteroid in a 29-year-old male participant at baseline, 4 weeks, and 12 weeks. Median nerve cross-sectional area (CSA) decreased progressively following hydrodissection, but there was no significant improvement after corticosteroid injection alone.



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Resources:

Abstract link

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