Iatrogenic rerouting of the lateral antebrachial cutaneous nerve during distal biceps tendon repair: a case report

Thuan Ly, MD, Itai Pasternak, MD, Claudia Meuli-Simmen, MD, Flavien Mauler, MD *

The Clinic of Hand, Reconstructive, and Plastic Surgery, Kantonsspital Aarau, Aarau, Switzerland

ARTICLE INFO

Keywords:
Biceps tendon
Repair
Complication
Nerve compression
Nerve rerouting
Lateral antebrachial cutaneous nerve

Complications after distal biceps tendon repair have been estimated to occur in 25% to 33% of patients, based on 3 systematic reviews that together evaluated 155 studies of 2855 elbows. Neurapraxia of the lateral antebrachial cutaneous (LABC) nerve is the most commonly encountered complication, occurring in approximately 8% of patients. It is most commonly associated with the anterior approach and is usually caused by traction on the nerve during exposure or by direct compression exerted by retractors. Here, we present a rare case of an iatrogenic LABC nerve displacement between the biceps tendon and bone during biceps tendon repair, necessitating revision surgery.

Case report

A healthy, 47-year-old man with a history of traumatic, closed, distal biceps tendon rupture was referred to our outpatient clinic 3 months after distal biceps tendon reattachment through a single anterior approach on the right dominant hand. He complained of increasing and debilitating pain in the anterolateral forearm from the second postoperative week onward, which did not respond to analgesic, nonsteroidal anti-inflammatory drugs, or pregabalin, and also strongly affected his sleep. He presented with dysesthesia of the anterolateral forearm and a positive Tinel-Hoffmann sign along the scar. The elbow was stable and exhibited full range of motion. A nerve conduction study revealed absence of conduction of the LABC sensory nerve. Local anesthetic infiltration produced short-term pain relief.

Surgical exploration was performed through an extended anterior approach along the same incision used for the original reattachment operation. The lateral border of the biceps was identified, but the nerve was not found in its correct anatomical position. The dissection was extended, and the LABC nerve was found to be dislocated medially and behind the sutured biceps tendon and was clearly compressed (Fig. 1). A tenotomy (Fig. 2), including a Z-plasty lengthening, was performed close to the former suture site to free the nerve and bring it into an anatomically correct position (Fig. 3).

On the first postoperative day, the patient reported marked pain relief from 9 preoperatively to 2 on a 10-point visual analog scale for pain. Passive elbow mobilization was initiated on the third postoperative day, and a brace was applied for 6 weeks, with no weight bearing for 8 weeks. At 12 weeks postoperative, pain had completely disappeared, with full range of motion through the elbow, and the patient returned to his job as a construction worker. The only remaining symptom was a slight forearm hypoesthesia, but the Tinel-Hoffmann sign had almost disappeared.

Discussion

To our knowledge, this case is the first report of inadvertent, iatrogenic LABC nerve rerouting during a primary distal biceps tendon reattachment operation. The LABC nerve arises from the fifth and sixth cervical nerve roots and is the terminal sensory branch of the musculocutaneous nerve. It courses along the anterior surface of the brachialis muscle, deep to the distal biceps muscle. The LABC nerve then pierces the brachial fascia lateral to the biceps tendon, passes deep to the cephalic vein, and divides into volar and dorsal branches, which provide cutaneous innervation of the radial aspect of the forearm. When the single-incision approach is used to perform the distal biceps tendon repair operation, it is essential for the surgeon to formally identify and protect the LABC nerve because of its proximity to the biceps tendon.

* Corresponding author: Flavien Mauler, MD, Clinic of Hand, Reconstructive and Plastic Surgery, Kantonsspital Aarau, Tellstrasse 25, CH-5001 Aarau, Switzerland. E-mail address: flavien.mauler@gmail.com (F. Mauler).
Neurapraxia is a known complication of distal biceps tendon repair, particularly when the single anterior incision technique is used.\textsuperscript{1,4,6,7} Neurapraxia can vary in degree and intensity. Common signs and symptoms are a Tinel-Hoffman sign, pain, and disturbances in sensation in the region of the affected nerve. Symptoms are typically transient and usually resolve in a few hours to 12 weeks after the injury.\textsuperscript{5}

The postoperative symptoms reported by this patient included persistent disabling pain, a highly positive Tinel-Hoffman sign with no improvement after 3 months, and nerve conduction study demonstrated a complete conduction block. These symptoms indicate a cause other than transient neurapraxia resulting from traction of the nerve and the need for a timely revision surgery with nerve exploration. Furthermore, exploratory local anesthetic infiltration at the site where the Tinel-Hoffman test was the most symptomatic provided major pain relief, but only for a short time, which confirmed that the pain arose along the LABC nerve. Magnetic resonance neurography, which was not performed in this case, could have further helped in the diagnosis and decision making, and would have made the surgical exploration easier because it would have shown that the nerve had been rerouted around and compressed by the reinserted biceps tendon.\textsuperscript{11}

The revision operation performed in this patient to liberate and relocate the LABC nerve required a tenotomy with an additional elongation tenoplasty and a subsequent 12-week rehabilitation program.

Conclusion

This report underlines the importance of identifying and protecting the LABC nerve during distal biceps tendon reattachment surgery, especially if it is retracted proximally. This case study also demonstrates the need for a high index of suspicion regarding persistent postoperative complaints of increasing and debilitating pain in the anterolateral forearm as an indication for revision surgery.

Acknowledgement

The authors thank Dagmar Gross for assistance with preparation of this manuscript.

Disclaimer

The authors, their immediate families, and any research foundations with which they are affiliated have not received any financial payments or other benefits from any commercial entity related to the subject of this article.

References

1. Amin NH, Volpi A, Lynch TS, Patel RM, Cerynik DL, Schickendantz MS, et al. Complications of distal biceps tendon repair: a meta-analysis of single-incision versus double-incision surgical technique. Orthop J Sports Med 2016; 4:2232596716668137. http://dx.doi.org/10.1177/2232596716668137
2. Beldner S, Zlotolow DA, Melone CP Jr, Agnes AM, Jones MH. Anatomy of the lateral antebrachial cutaneous nerve: an anatomic study in human cadavers. Am J Orthop (Belle Mead NJ) 1998;27:690-2.
3. Brogan DM, Bishop AT, Spinner RJ, Shin AV. Lateral antebrachial cutaneous nerve compression after subpectoral biceps tenodesis: a case report. J Shoulder Elbow Surg 2015;24:e195-9. http://dx.doi.org/10.1016/j.jse.2015.03.022
4. Cain RA, Nydick JA, Stein MI, Williams BD, Polikandriotis JA, Hess AV. Complications of distal biceps tendon repair, particularly when the single anterior incision technique is used.\textsuperscript{1,4,6,7} Neurapraxia can vary in degree and intensity. Common signs and symptoms are a Tinel-Hoffman sign, pain, and disturbances in sensation in the region of the affected nerve. Symptoms are typically transient and usually resolve in a few hours to 12 weeks after the injury.\textsuperscript{5}

The postoperative symptoms reported by this patient included persistent disabling pain, a highly positive Tinel-Hoffman sign with no improvement after 3 months, and nerve conduction study demonstrated a complete conduction block. These symptoms indicate a cause other than transient neurapraxia resulting from traction of the nerve and the need for a timely revision surgery with nerve exploration. Furthermore, exploratory local anesthetic infiltration at the site where the Tinel-Hoffman test was the most symptomatic provided major pain relief, but only for a short time, which confirmed that the pain arose along the LABC nerve. Magnetic resonance neurography, which was not performed in this case, could have further helped in the diagnosis and decision making, and would have made the surgical exploration easier because it would have shown that the nerve had been rerouted around and compressed by the reinserted biceps tendon.\textsuperscript{11}

The revision operation performed in this patient to liberate and relocate the LABC nerve required a tenotomy with an additional elongation tenoplasty and a subsequent 12-week rehabilitation program.

Conclusion

This report underlines the importance of identifying and protecting the LABC nerve during distal biceps tendon reattachment surgery, especially if it is retracted proximally. This case study also demonstrates the need for a high index of suspicion regarding persistent postoperative complaints of increasing and debilitating pain in the anterolateral forearm as an indication for revision surgery.

Acknowledgement

The authors thank Dagmar Gross for assistance with preparation of this manuscript.

Disclaimer

The authors, their immediate families, and any research foundations with which they are affiliated have not received any financial payments or other benefits from any commercial entity related to the subject of this article.

References

1. Amin NH, Volpi A, Lynch TS, Patel RM, Cerynik DL, Schickendantz MS, et al. Complications of distal biceps tendon repair: a meta-analysis of single-incision versus double-incision surgical technique. Orthop J Sports Med 2016; 4:2232596716668137. http://dx.doi.org/10.1177/2232596716668137
2. Beldner S, Zlotolow DA, Melone CP Jr, Agnes AM, Jones MH. Anatomy of the lateral antebrachial cutaneous nerve: an anatomic study in human cadavers. Am J Orthop (Belle Mead NJ) 1998;27:690-2.
3. Brogan DM, Bishop AT, Spinner RJ, Shin AV. Lateral antebrachial cutaneous nerve compression after subpectoral biceps tenodesis: a case report. J Shoulder Elbow Surg 2015;24:e195-9. http://dx.doi.org/10.1016/j.jse.2015.03.022
4. Cain RA, Nydick JA, Stein MI, Williams BD, Polikandriotis JA, Hess AV. Complications of distal biceps tendon repair, particularly when the single anterior incision technique is used.\textsuperscript{1,4,6,7} Neurapraxia can vary in degree and intensity. Common signs and symptoms are a Tinel-Hoffman sign, pain, and disturbances in sensation in the region of the affected nerve. Symptoms are typically transient and usually resolve in a few hours to 12 weeks after the injury.\textsuperscript{5}

The postoperative symptoms reported by this patient included persistent disabling pain, a highly positive Tinel-Hoffman sign with no improvement after 3 months, and nerve conduction study demonstrated a complete conduction block. These symptoms indicate a cause other than transient neurapraxia resulting from traction of the nerve and the need for a timely revision surgery with nerve exploration. Furthermore, exploratory local anesthetic infiltration at the site where the Tinel-Hoffman test was the most symptomatic provided major pain relief, but only for a short time, which confirmed that the pain arose along the LABC nerve. Magnetic resonance neurography, which was not performed in this case, could have further helped in the diagnosis and decision making, and would have made the surgical exploration easier because it would have shown that the nerve had been rerouted around and compressed by the reinserted biceps tendon.\textsuperscript{11}

The revision operation performed in this patient to liberate and relocate the LABC nerve required a tenotomy with an additional elongation tenoplasty and a subsequent 12-week rehabilitation program.

Conclusion

This report underlines the importance of identifying and protecting the LABC nerve during distal biceps tendon reattachment surgery, especially if it is retracted proximally. This case study also demonstrates the need for a high index of suspicion regarding persistent postoperative complaints of increasing and debilitating pain in the anterolateral forearm as an indication for revision surgery.

Acknowledgement

The authors thank Dagmar Gross for assistance with preparation of this manuscript.

Disclaimer

The authors, their immediate families, and any research foundations with which they are affiliated have not received any financial payments or other benefits from any commercial entity related to the subject of this article.

References