

Pathologic Changes Observed with Use of Micronized Dehydrated Human Amnion/Chorion Membrane Injections after Surgical Excision of Plantar Fibromatosis: a Unique Case Study

Windy Cole, DPM, Akron General Medical Center, Akron, OH

SAWC Fall Meeting, September 26 - 28, 2015 in Las Vegas, NV

Poster # CS - 023

Abstract

Plantar fibromatosis is a relatively uncommon hyperproliferative disorder of the plantar aponeurosis of unknown etiology. Clinical symptoms include pain and swelling of the foot, which can lead to walking difficulties and disability. Physical examination reveals nodules and contracture of the plantar fascia. Inhibition of tumor necrosis factor (TNF) may prevent progression or recurrence of fibromas. Cell regulatory factors including TNF- α and IL-10 have been shown to be down regulated in the presence of dehydrated human amnion/chorion membrane (dHACM). We present the case of a middle-aged female with recurrent plantar fibroma, who after being treated conservatively for 7 years required surgical excision. Micronized dHACM reconstituted with normal saline was injected into the surgical site in the operating room. Two additional dHACM injections in the surgical site were administered at the physicians' office at post-operative weeks 8 and 16. Biopsies were taken during surgery and 5 months later. The initial pathology report noted partial excision of plantar fibromatosis. Normal fascial tissue was present with ill-defined fibrosis, without calcification, necrosis, hemorrhage or other significant abnormalities. The pathology report on the biopsy taken after 3 micronized dHACM treatments demonstrated necrotizing granulomatous inflammation in the deep dermis, with residual plantar fibromatosis at the surgical margins. The necrotizing granulomas contained crystalline foreign material consistent with the therapy effect, and when compared with the previous biopsy the fibromatosis was less well delineated, with less basophilia of the spindle cells. Overall we observed less nodularity, less vascularity, and collapsed vessels. Nuclear beta-Catenin immunostain confirmed the presence of residual fibromatosis. The patient reported a decrease in pain and deformity with an increase in function compared to her pretreatment state. The foot healed well without sequelae. These results suggest that bioactive properties of dHACM may help to regulate cellular activity and reduce development of fibrosis.

Background

- Plantar fibromatosis (Ledderhose disease) is a relatively uncommon hyperproliferative disorder of the plantar aponeurosis of unknown etiology.¹
- Physical examination reveals nodules and contracture of the plantar fascia.
- Clinical symptoms include pain and swelling of the foot, which can lead to walking difficulties and disability.
- Failure to reduce pain symptoms with conservative treatment such as orthotic insoles, anti-inflammatory medications, and corticosteroid injections may lead to the use of radiotherapy or surgery.¹
- Recurrence rates of up to 100% have been reported after local excision, and in 25% of patients having complete fasciectomy.²
- Inhibition of tumor necrosis factor (TNF) may prevent progression or recurrence of fibromas.³

Dehydrated Human Amnion/Chorion Membrane (dHACM)

- PURION® Processed dehydrated human amnion/chorion membrane (dHACM) contains 57 growth factors, cytokines, and chemokines that regulate wound healing.⁴⁻⁶
- A micronization process creates a dHACM powder that can be suspended in sterile saline for injection.
- Cell regulatory factors including TNF- α and IL-10 have been shown to be down regulated in the presence of dHACM⁶, thus the use of dHACM as an adjunct to surgical excision is plausible.

Purpose

- We present the case of a middle-aged female with a recurrent plantar fibroma treated with micronized dHACM.

Case

Case History

- 50 year old female with a painful fibroma of the left foot, recurrent after previous surgical removal.
- Over the past 7 years, treatment included orthotics, pain management, and intermittent corticosteroid injections with transient relief of pain.
- The deformity continued to worsen and the patient had very limited ability to ambulate on this foot.

Procedure

- In the OR, a portion of the plantar fibroma was biopsied.
- Micronized dHACM reconstituted with normal saline was injected into the surgical site and surrounding tissues.
- Two additional dHACM injections were administered to the area in the physicians' office at post-operative weeks 8 and 16.
- A subsequent biopsy was taken at 5 months post-op.

Results

- The patient received 3 dHACM injections over a 4 month period.
- She reported a decrease in pain and deformity with an increase in function compared to her pretreatment state.
- The foot healed well without sequelae.

Figure 1. Plantar fibroma of the left foot.



Figure 2. Patient underwent a biopsy of the fibroma and was treated with an injection of micronized dHACM in the OR.



Results

Figure 3. The initial pathology report noted partial excision of plantar fibromatosis. Normal fascial tissue was present with ill-defined fibrosis, without calcification, necrosis, hemorrhage or other significant abnormalities.

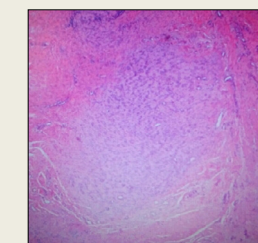
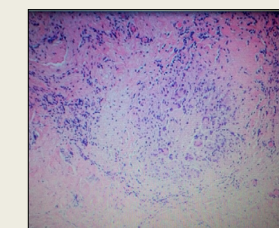


Figure 4. The pathology report on the biopsy taken after 3 micronized dHACM treatments noted that when compared with the previous biopsy, the fibromatosis was less well-delineated, with less basophilia of the spindle cells. Nuclear beta-Catenin immunostain confirmed the presence of residual fibromatosis.



Overall, we observed less nodularity, less vascularity and collapsed vessels.

Conclusions

- In the case presented, micronized dHACM injections were an effective treatment for a patient with recurrent plantar fibroma.
- These results suggest that based on its ability to regulate TNF, dHACM may help to regulate cellular activity and reduce development of fibrosis, as evidenced by the decreased progression and regression of the lesions observed in this case.

References

- Veith NT, Tschernig T, Histing T, Madry H. Plantar fibromatosis – topical review. *Foot Ankle Int.* 2013 Dec;34(12):1742-6.
- van der Veer WM, Hamburg SM, de Gast A, Niessen FB. Recurrence of plantar fibromatosis after plantar fasciectomy: single-center long-term results. *Plast Reconstr Surg.* 2008 Aug;122(2):486-91.
- Verjee LS, Verhoekx JS, Chan JK, Krausgruber T, Nicolaidou V, Izadi D, Davidson D, Feldmann M, Midwood KS, Nanchahal J. Unraveling the signaling pathways promoting fibrosis in Dupuytren's disease reveals TNF as a therapeutic target. *Proc Natl Acad Sci U S A.* 2013 Mar 5;110(10):E928-37.
- Koob TJ, Rennert R, Zabeck N, Masee M, Lim JJ, Temenoff JS, Li WW, Gurtner G. Biological properties of dehydrated human amnion/chorion composite graft: implications for chronic wound healing. *Int Wound J.* 2013;10(5):493-500.
- Koob TJ, Lim JJ, Masee M, Zabeck N, Denozière G. Properties of dehydrated human amnion/chorion composite grafts: implications for wound repair and soft tissue regeneration. *J Biomed Mater Res B Appl Biomater.* 2014 Aug;102(6):1353-62.
- Koob TJ, Lim JJ, Masee M, Zabeck N, Rennert R, Gurtner G, Li WW. Angiogenic properties of dehydrated human amnion/chorion allografts: therapeutic potential for soft tissue repair and regeneration. *Vasc Cell.* 2014 May 1;6:10.

dHACM = EpiFix®, MiMedx Group, Inc., Marietta, GA
EpiFix® and PURION® are registered trademarks of MiMedx Group, Inc.