CHAPTER 30

SURGICAL AUTOIMMUNIZATION AGAINST VERRUCA: Approach and Expectations

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Many treatments are available for verrucae plantaris simply because there exists no one ideal treatment. Most treatments are less than ideal because they involve multiple office visits, high cost, or pain or discomfort during the course of the treatment. Surgical autoimmunization against verruca plantaris with autogenic graft of papilloma in situ was first described by Nikos Panacos in 1980 as another treatment for verrucae plantaris.[1] This surgical procedure is effective in cases of severe, multiple warts on the foot.

Patients seek treatment for warts primarily due to unsightly appearance, pain, and concern that the lesions might spread.[2] When choosing a treatment regimen, several factors should be considered including size, number of lesions, location, presence of pain, previous treatment, and patient immunological status. The forms of treatment most commonly used for verrucae plantaris include topical keratinolytic agents, laser excision, surgical curettage, and Cimetidine or other antiviral/antitumor agents.[3] Other forms of therapy now used more often include the use of topical or oral medications to boost the immune system, which is believed to ultimately result in the disappearance of the verrucae and clearing of the virus from the keratinocytes. It is generally accepted, however, that topical medications alone with routine debridement are not effective for the treatment of mosaic warts.[4-6]

It is well known that the human papilloma virus (HPV) is the actual cause of verrucae plantaris. HPV, a DNA Papillomavirus, is classified into more than 75 subtypes. Verrucae plantaris has been classified as HPV subtypes 1,2, or 4.[7] The virus affects the keratinocytes in the basal layer of the epidermis, where it is nourished by blood supply from the dermis. A number of vaccines have been developed for other DNA viruses, however there is no vaccine currently available for the treatment of verrucae.

The literature presents some cases where spontaneous regression of plantar warts was identified. It is generally accepted that up to 60% of cases of plantar warts will go into "spontaneous" remission within two years of appearance in a healthy individual.[8] The warts subside and eventually disappear due to the body's immune system eliminating the papillomavirus. Two factors substantiate the involvement of the immune system in eradicating the warts: the amount of lymphocytes usually found in regressing warts, and the delayed hypersensitivity that develops in intradermally-injected verrucous tissues. The opposite is clearly true, for as many as 45% patients who are immunosuppressed are infected with the HPV virus.[7]

There are an increasing number of studies showing evidence of both cellular and humoral immune reaction to wart antigen in vivo and in vitro. Cellular immune reaction is produced when helper T-cells fight the viral infection by producing cytotoxic lymphokines, which stimulates phagocytosis and destroys virus-infected cells.[1] The humoral response is shown by the measurable changes in IgE, IgM, and IgA to the virus. These increased titers do not necessary mean that the antibodies are active in eliminating the virus, but they increase in response to the viral particles from the destroyed virus.[5,9]

The technique described involves partial excision and concomitant implantation of the verrucous tissues through the dermal tissues, closer to a well-vascularized area on the ipsilateral foot. This implantation is believed to cause an autoimmunization process of the host to the HPV virus responsible for the warts. This process is believed to work by inducing a cell-mediated immune response to clear verrucae-inducing human papillomavirus from the body. Once the autoimmune reaction is complete, the verrucae usually regress in a period of 2 to 6 weeks. This immunotherapeutic technique acts similar to that of a vaccine but does not involve the in vitro preparation.

PROCEDURE

The foot is prepped and draped in a sterile fashion. The largest verruca is identified and an ellipse measuring one centimeter in length is drawn in the

center of the wart. Two semi-elliptical incisions are created through the skin and the dermis. Utilizing a pair of Adson's forceps, the ellipse is removed and placed in a moist sponge where it will be used later for the graft. It is not necessary to remove the hypertrophied tissues at this time since they are removed before the implantation. The incision is then closed with 3-0 Prolene in a simple interrupted fashion or with horizontal mattress sutures.

Attention is then directed to the recipient site. A 1.5 cm incision is placed medially, at the mid-distance of the first metatarsal over the abductor hallucis muscle.(Fig. 1) The incision is deepened though the skin and into the subcutaneous tissues. Care is taken to avoid all neurovascular structures in the area medial to the first metatarsal. Careful dissection can prevent a nerve entrapment, which can be more painful, than the verrucae themselves. When the deep fascia is identified, a small incision is created in the fascia revealing the muscle belly.(Fig. 2) At this point, the donor tissue is examined. Utilizing a #15 surgical blade, as much of the keratin layer as possible is removed, leaving only a small amount of verrucous tissue in the graft.(Figs. 3, 4) The graft is then placed over the belly of the abductor hallucis muscle and tagged with an absorbable 3-0 suture to the deep fascia.(Fig. 5) This allows the graft to be secured. The area is then flushed with saline and the tissues over the graft are reapproximated with 3-0 Prolene with simple interrupted or horizontal mattress sutures.(Fig. 6) A dry sterile dressing is then applied over the surgical site.

The patient is kept full-weightbearing in a surgical shoe for two weeks. After two weeks, the sutures are removed and debridement of the verrucous tissues is performed. The necrotic tissues will slough off the wound, revealing healthy tissue.

Figure 1. An incision is made over the belly of the abductor hallucis brevis muscle belly.

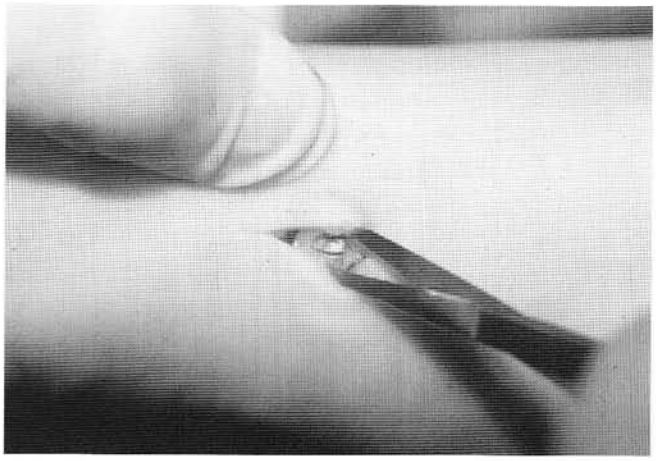

Figure 2. The deep fascia is incised, showing the belly of the abductor hallucis brevis muscle.

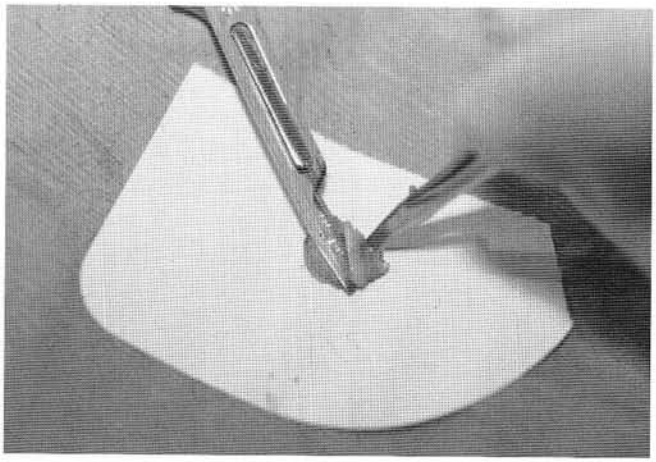

Figure 3. The keratin layer of the superficial epidermis is removed from the deeper epidermal layer.

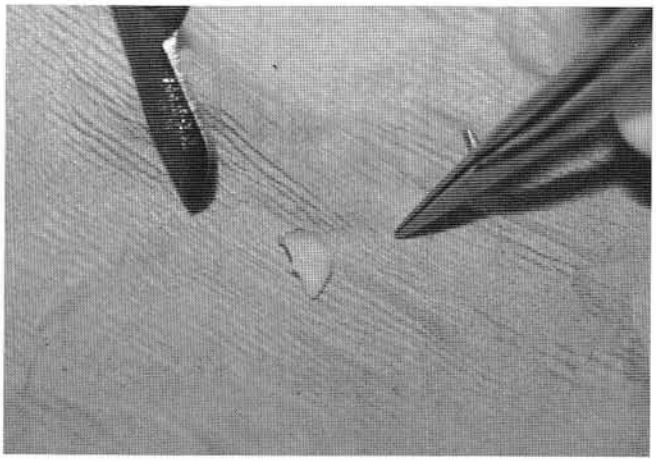

Figure 4. The small piece of deep viral-infected epidermal tissues that will be implanted into the recipient site.

DISCUSSION

This procedure is relatively easy to perform. It allows the patient to be fully weightbearing immediately following the procedure. Very rarely does the patient need pain medication since minimal dissection is performed. However, one should not expect immediate results since the body's immune reaction will slowly resolve the viral infection.

Possible complications of the procedure are the formation of an epidermal inclusion cyst (Fig. 7) or pruritus. The cyst usually forms one month following the graft and tends to occur when an insufficient amount of epidermal tissue is removed from the graft. Treatment is incision of the cyst. Antibiotics should not be used as they may interfere with the autoimmune response.[1,4] Pruritus at the host site should be considered part of the autoimmune response. Topical cortisone treatment should be avoided. Infection is a rare complication, and can usually be avoided through the use of careful sterile technique.

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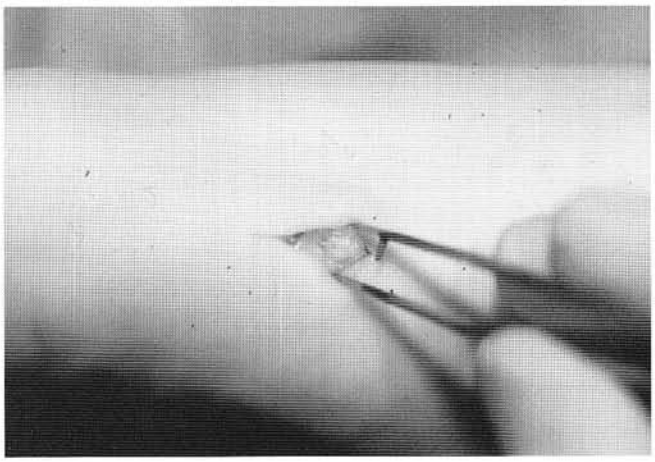

Figure 5. The graft is placed directly in contact with the muscle belly, and sutured to the deep fascia with 3-0 absorbable sutures.

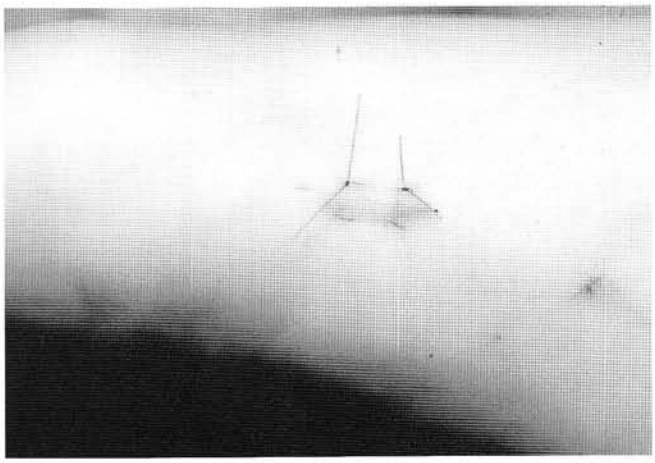

Figure 6. Closure is performed with non-absorbable sutures.

Figure 7. Formation of an epidermal inclusion cyst.