Sterile matrix grafting for onycholysis in the setting of valproic acid use

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Key words: nail nonadherance; sterile matrix grafting; valproic acid.

INTRODUCTION

Valproic acid (VPA), a widely used antiepileptic drug and mood stabilizer, has myriad cutaneous side effects including transient alopecia, exanthems, and vasculitides.[1-3] We report on a patient who, in the setting of VPA use, presented with nail nonadherence secondary to sterile matrix scarring and propose nail bed excision with sterile matrix grafting as a surgical solution.

Abbreviation used:

VPA: valproic acid

CASE REPORT

A 26-year-old epileptic woman who has taken VPA 500 mg twice a day since childhood, presented with a 1-year history of onycholysis and a dorsal pterygium of her right third digit (Fig 1). Preoperative fungal cultures were negative, and magnetic resonance imaging was significant for increased thickness of the nail matrix. The patient opted for reconstruction of the nail matrix using a split toenail matrix graft.

The right third digit nail plate was lifted and removed. Dense scarring with distortion of the sterile matrix was noted. This was excised with care not to disturb the germinal matrix, yielding a 10-mm × 5-mm defect. The left great toenail plate was lifted and a sterile matrix graft 10 × 5 mm was obtained transferred, and secured to the sterile matrix of the right middle finger (Fig 2). Using 6-0 and 7-0 Ethicon plain gut suture, simple interrupted sutures were placed at the 4 corners of the graft. Sutures were subsequently placed in between the existing ones to prevent avulsion. The nail plate was replaced in the eponychial fold to maintain patency, and dressings were applied. Both five-month and long-term postoperative follow-up found a well-healing surgical site with nail plate adherence and minimal donor site morbidity (Fig 3), results which are demonstrated in a comparison of the patient's preoperative presentation and postoperative results (Fig 4).

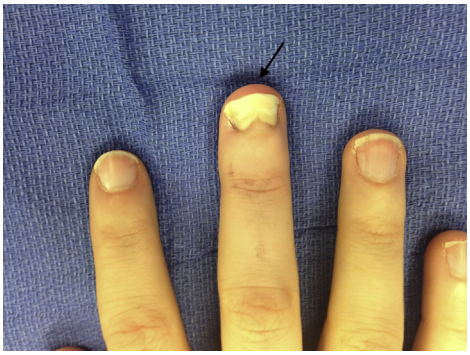

Fig 1. Chronic nail deformity secondary to sterile matrix scarring.

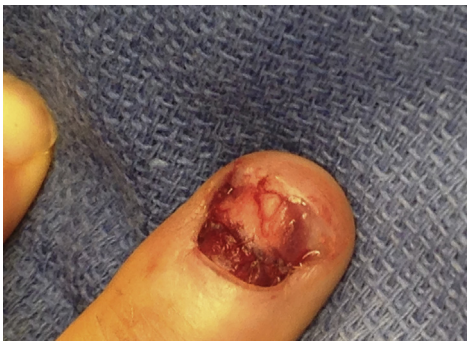

Fig 2. Sterile matrix graft in situ following excision of scarred bed.

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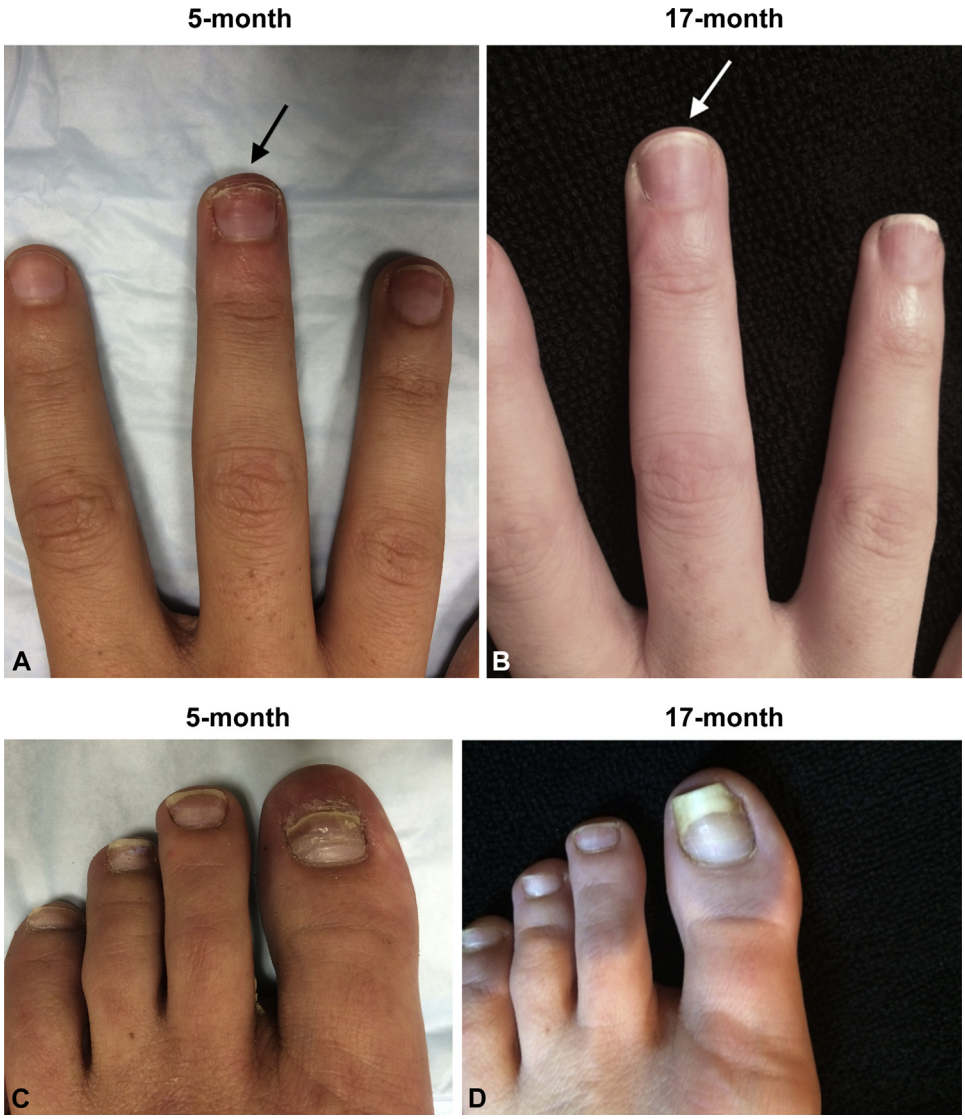

Fig 3. Postoperative follow-up demonstrating nail plate adherence without residual leukonychia both at 5 months and long-term (17 months) (**A** and **B**) with minimal great toe donor site morbidity (**C** and **D**).

DISCUSSION

Patients with nail deformities seek treatment of both cosmetic and functional deformities. The nail not only contributes to the overall aesthetics of the hand but is also involved in function, including fine pinch, pulp stability, and dorsal protection.

Anticonvulsant medications, including VPA, have been linked to various nail deformities including hyperpigmentation and onychodystrophy.[4-6] One such deformity, onycholysis, or separation of the nail plate from the nail bed, in association with VPA use has been described in several case reports.[7,8] The authors speculate that onycholysis formed secondary to a disturbance of zinc metabolism caused by a combination of sodium valproate–induced malabsorption and systemic chelation of zinc.[9,10] A second such deformity is onychomadesis, or separation of the nail plate from the proximal nail fold with shedding of the nail plate. A study by Poretti et al[11] describes onychomadesis 4 years after initiation of VPA. Lastly, changes in nail pigment have been found in association with VPA therapy.[12]

Although the aforementioned nail deformities have been said to resolve after discontinuation of VPA, treatment of these deformities is challenging when the cessation of VPA is not medically advisable.

Previous attempts to replace the nail matrices with skin or dermal grafts have been unsuccessful.[13] A large body of literature supports good functional and cosmetic outcomes of free nail matrix grafts in the treatment of nail avulsion injuries.[14] The use of a

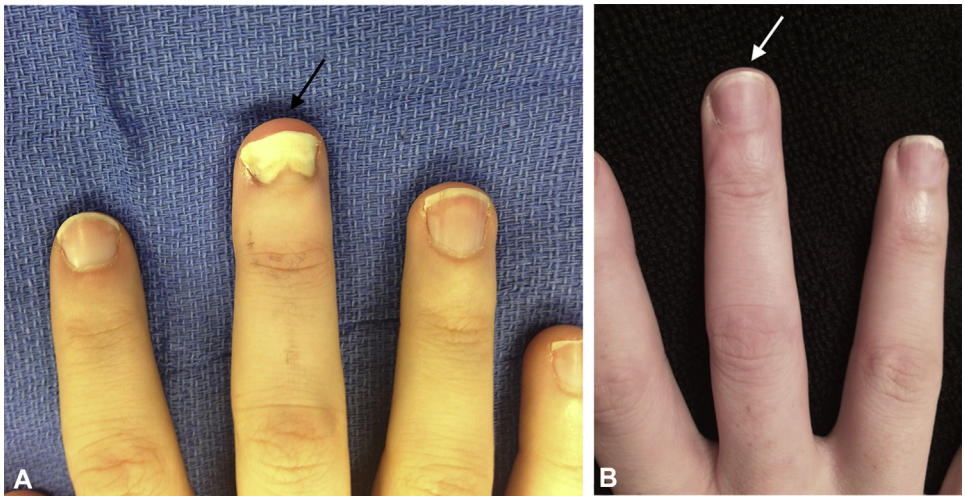

Fig 4. A comparison of the patient's preoperative presentation (**A**) and postoperative results (**B**).

sterile matrix graft from the great toe has been found to help the nail regain the smooth and adherent qualities of a normal-appearing nail.[15]

Our patient presented with a thickened and scarred sterile matrix, which resulted in formation of a dorsal pterygium and onycholysis, findings that have been substantiated in the literature.[13] Our surgical approach stemmed from the principle that a normal sterile matrix is required for nail adherence and growth. Therefore, we first excised the area of scarred sterile matrix and subsequently harvested a sterile matrix graft from the great toe for use in reconstruction of our defect. This surgical approach follows the central plastic surgery tenant of replacing like tissue with like tissue while inflicting little donor site morbidity.

CONCLUSION

Onycholysis, onychomadesis, and nail hyperpigmentation are described as rare side effects of VPA therapy. Several case reports suggest resolution of the deformities with cessation of VPA therapy. However, there are some patients who require continued antiepileptic therapy. In such patients, we suggest sterile matrix grafting as a surgical intervention to correct this rare adverse effect.

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