Topical brimonidine for pyogenic granuloma after paronychia surgery

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Key words: brimonidine; noninvasive therapy; paronychia surgery; pyogenic granuloma.

INTRODUCTION

Pyogenic granuloma (PG) is a benign vascular proliferation occurring on the skin or subcutaneous tissue and arises at the sites of trauma, infection, foreign body reactions, or delayed wound healing.[1] Paronychia often appears in the hallux, where periungual PG is unpredictable. The current treatment options for PG consist of excision, cryotherapy, laser, electrocautery, and topical or oral medical therapy.[2] Here, we present a case of topical brimonidine tartrate eye drop application for PG on the toe after a paronychia surgery.

Abbreviation used:

PG: pyogenic granuloma

CASE REPORT

A 17-year-old boy presented with suppuration of the first toe of both feet and excruciating pain (Fig 1, *A*). We performed surgical treatment of a partial nail avulsion and lateral nail fold excision as the clinical manifestations were consistent with those of paronychia of the nail embedment (Fig 1, *B*); the lateral horns of the nail matrix were also excised.

On the 7th day after the surgery, the operation site of the first toe of the left foot developed pain and slight pyosis. The suture was removed on the 14th day as planned, but erythematous nodules and an erosive surface gradually appeared in the next following 8 days, consistent with the lesions of PG (Fig 1, *C*).

Due to the fear of pain during local anesthesia and post the surgery and risk of recurrence, he refused all invasive treatments. Considering the infected condition of this therefore we treated him using a conservative approach. He was treated with wet compression of 0.2% topical brimonidine tartrate eye drops twice daily after the lesion was disinfected with povidone iodine. After several days of the 0.2% topical brimonidine tartrate eye drop treatment, the pain was significantly relieved, with visible improvement. Fifteen days after the effective treatment, the skin lesions of PG improved (Fig 1, *D*), with no perceived side effects, such as drowsiness, hypotension, or bradycardia.

DISCUSSION

Brimonidine, a highly selective alpha-2 adrenergic receptor agonist, is widely used for the treatment of open-angle glaucoma or ocular hypertension.[3,4] The topical application of brimonidine gel may reduce facial erythema by inducing cutaneous vasoconstriction of rosacea.[3,5] Brimonidine, with the characteristics of rapid metabolism and systemic clearance, has no significant affects on the heart rate and blood pressure.[4] However, some medicines, such as tricyclic antidepressants or monoamine oxidase inhibitors, may influence brimonidine's metabolism.[6]

The etiology of paronychia mainly includes an ingrown toenail, trauma, and infection. Surgery is an effective method to treat paronychia, but complications such as PG cannot be avoided, especially if postoperative infection occurs. PG is a disorder of benign vascular proliferation, with rapidly growing erythematous nodules developing into pedunculated tumors that may be subject to erosion and bleeding.[7] The exact pathogenic mechanism is not fully clear and has been associated with trauma,

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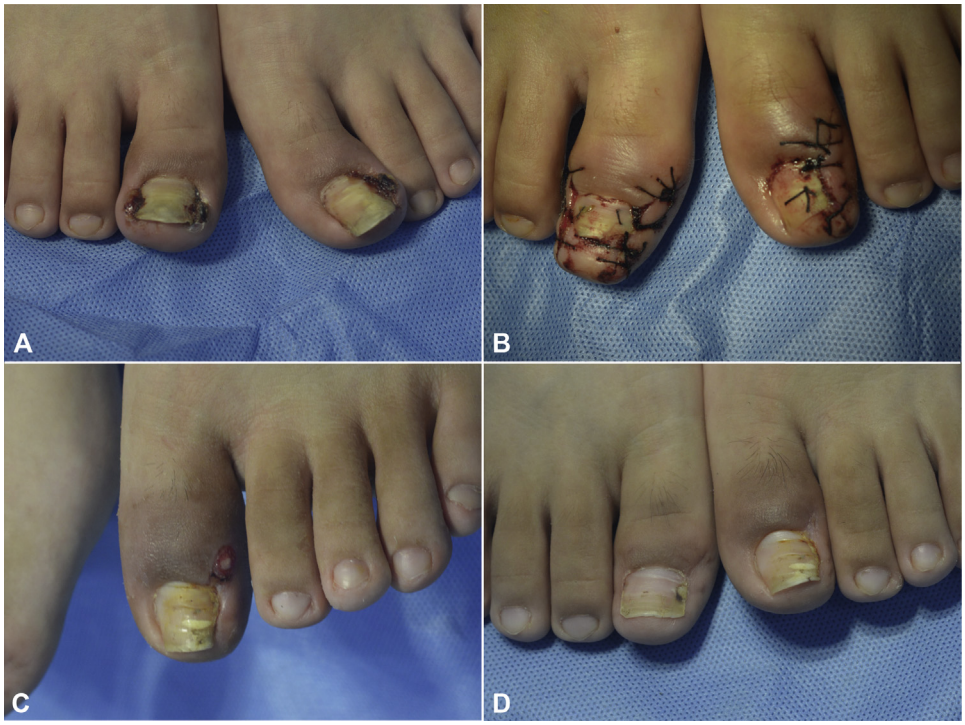

Fig 1. Treatment of PG in the toe with topical brimonidine after a paronychia surgery. **A**, Initial stage of severe paronychia prior to the surgery. **B**, Photograph at the postoperative stage. **C**, Gradual formation of PG within 22 days after the surgery. **D**, Postmedical outcome after 15 days of the treatment with topical brimonidine. *PG*, Pyogenic granuloma.

infection, foreign body reactions, pregnancy, immunosuppression, several drugs, and delayed wound healing.[2,8] The current available treatment options include topical or systemic pharmacotherapies, silver nitrate, surgical intervention, semi-invasive therapies, laser, and others.[2] In terms of topical pharmacotherapies, beta blockers, such as timolol or propranolol, toll-like receptor 7 agonists, such as imiquimod, and other medicines are available. Overall, the relapse rate of PG is about 4.56%; surgical excision among the surgical management options is the most effective method, with a lower recurrence rate (2.94%) compared with nonsurgical treatments (3.67%), including cryotherapy, laser, liquid nitrogen refrigeration, and topical pharmacotherapies.[9]

Our patient began to show symptoms of pain and slight pyosis on the 7th day postoperatively, but PG still developed gradually within 22 days since the operation in spite of the postoperative suture removal that took place after 14 days of the surgery. PG can resolve spontaneously without treatment after suture removal, but it continued to develop in our patient after the removal of the stitches. Therefore, it is unknown whether PG in this case was caused by a foreign body reaction or infection. As a single case study, it is uncertain whether brimonidine alone was the solution that cured PG in our case, but it definitely shortened the disease course.

New PG may occur after PG surgery as local trauma or infection may induce the formation of granulation tissue. Our patient was very reluctant to undergo another invasive treatment. We introduced this method, which is worth considering as an alternative option for PG treatment. The patient was basically cured within 15 days of using brimonidine, which is a shorter course than that of other regimens.[6] Although there are various treatments available for PG, many patients are reluctant to undergo surgical treatment and other semi-invasive therapies. Meanwhile, recurrence may occur after invasive treatments. Therefore, determining a reasonable and individualized treatment plan for these specific patients is of great significance.

We used brimonidine due to its positive effect in the treatment of rosacea and its insignificant effect on the heart rate and blood pressure.[3-5] PG demonstrates weak expression of beta-adrenergic receptors, which is also a reason to consider brimonidine.[10] We are in favor of the prophylactic use of a topical treatment, such as brimonidine, after

surgery to reduce the risk of PG development or recurrence. We also expect that it may play a role in treating periungual PG secondary to chemotherapy or other medications.

To the best of our knowledge, the use of topical brimonidine for PG has never been reported in the literature. It offers more possibilities for patients with PG to avoid unnecessary invasive treatments and achieve complete cure without pain and complications. It has a high potential to supplement noninvasive therapies and potentially avoid invasive treatments.

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