

## Use of topical nitroglycerin in improving perfusion of flaps used for breast reconstruction

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### Abstract

Various methods are used for breast reconstruction but the most commonly used flap is a pedicled flap. Though meticulously done, flap necrosis remains a troublesome complication in breast reconstruction as it not only increases the hospital stay, it also affects the esthetic of the reconstruction. In this article we would like to share our experience of using nitroglycerin in prevention of breast reconstruction flap necrosis.

**Keywords:** Flap survival, Topical nitroglycerin, Flap perfusion.

### Introduction

Reconstruction of breast involves using various flaps including pedicled and free flaps. It not only helps in providing a coverage of raw area, but also provides an improved aesthetic outcome for the patient. Despite technological advancements, flap necrosis remains a major complication in any type of reconstruction. It was reported to be about 2-22%.<sup>1</sup> Nitroglycerin as oral tablets has been popularly used in treating cardiac ischemia, by its vasodilation and its antithrombotic action.<sup>2</sup> The main reason for flap necrosis in most cases are Vasoconstriction and thrombosis of the pedicle. Hence in this article, we tried to extrapolate the use of nitroglycerin in salvage of flap.

### Materials and Methods

The study was conducted in the Department of Plastic surgery, in a tertiary care center. Institutional ethical committee approval was obtained. Patient consent was obtained. The cost of topical preparation of nitroglycerine was 34 rupees for 30gm.

### Case 1

The patient was a case of Post chemotherapy and radiation for Breast carcinoma, with the tumor downsized. Patient underwent Modified radical Mastectomy, and the defect was covered with a Lattismus Dorsi Myocutaneous pedicled flap. Post operatively, topical NTG (figure 1) was applied at a low

dose (4.5mg) with repeated application (3 times daily) for 3 days and continued till 7th post-operative day. There was no necrosis noted in the flap edges.



**Fig. 1:** Occlusive dressing with Nitroglycerin in it



**Fig. 2:** Post Topical application of NTG over the Lattismus dorsi flap

## Case 2

The patient was a case of recurrent sarcoma of the left breast, for which wide local excision was done, and the defect was closed with Ipsilateral Thoracoabdominal flap. Immediately post surgery, the patient developed a discolored congested patch at the tip of the flap and the margins (Fig. 3). Topical NTG was started immediately at a low dose (4.5mg) with repeated application (3 times daily) for 3 days and continued till 7th post-operative day. The necrotic patch significantly lightened post NTG application (Fig. 4)



**Fig. 3:** Thoracoabdominal flap with congestion at the tip and margins



**Fig. 4:** Markedly reduced congestion post application of Nitroglycerin

## Discussion

The first Successful use of topical NTG application to prevent flap necrosis was reported by Rohrich in animal models 1984.<sup>3</sup> The first report of topical NTG flap in humans was by Schauer in 1986.<sup>4</sup> Nitro-glycerine, or glyceryl nitrate, is an organic nitrate.<sup>3</sup> It is a direct vasodilator which is available as solution, ointments and transdermal patches. It releases nitric oxide (NO) and activates intracellular cyclic guanosine monophosphate (cGMP) and inhibition of myosin light chain kinase, and therefore causes relaxation of vascular smooth muscle.<sup>2</sup> The increase in calibre of arteries and veins increases blood flow to the area of application.<sup>5</sup> Aral et al described an increase in vascularity in the rats, most pronounced in day 7.<sup>6</sup> The advantages are that it is available in forms which are easily applicable. But the disadvantages are that it causes side effects like dizziness, hypotension, headaches, and due to its short half life it needs to be repeatedly applied.

In our study, as comparable to other studies, we noted increased vascularity and thereby prevention of flap necrosis in one patient, with arresting and reverting of the occurred flap necrosis in another.

## Conclusion

In our study we have come to the conclusion that topical nitroglycerine is useful in prevention of flap necrosis, and is easily available, however ours is a small study and needs large scale RCT to bring the intervention to practice.

## Source of Funding

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## Conflict of Interest

None.

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