

Is transdermal nitroglycerin application effective in preventing and healing flap ischaemia after modified radical mastectomy?

To the Editor: We read the article by Kutun *et al.* on the use of transdermal nitroglycerin application in preventing and healing flap ischaemia after modified radical mastectomy with interest.¹ Although we do not dispute the numerous attributes of nitroglycerin, we would like to voice some concerns and highlight certain relevant issues not discussed by the authors in this paper.

We are surprised that during the study period no breast-conserving surgery (BCS) was performed in a large cohort of patients treated for early breast cancer (stage II). It is well documented that despite trends toward breast-conserving surgery for breast cancer, a significant number of women are still subjected to mastectomy as their primary surgical therapy. This figure, however, is never 100%.^{2,3}

Mastectomy is associated with significant skin flap complications, with a prevalence ranging from 18% to 30% (average 26%). These increase morbidity and healthcare costs, result in prolonged hospitalisation, and delay the initiation of adjuvant therapy (chemotherapy or radiotherapy).

It is known that blood perfusion to the subdermal plexus of the skin is controlled by the autonomic nervous system in response to variations in metabolic demands and environmental factors.² The authors are correct in stating that temperature, tissue perfusion and neural stimuli can affect flap perfusion and thus complication rates. However, it remains important to ensure that the blood supply to the subdermal plexus is not compromised. In this respect it is important to understand risk factors for flap necrosis and to abide by simple surgical principles.

Wound morbidity following mastectomy is related to the creation of large thin flaps, and the use of cautery. Very thin flaps should be avoided, as they tend to develop necrosis. A flap thickness of 5 mm is recommended. Flap thickness refers to the measurement of the skin flap at its most distal aspect. There is currently no standardised method for measuring mastectomy skin flap thickness intra-operatively, and this remains a surgical judgement call. The use of calipers may be helpful.

Flap length usually refers to the superior flap length, as this is typically the longest flap in a mastectomy. Longer flap length is associated with flap necrosis, consistent with the concept that the blood supply of longer flaps is more tenuous, probably owing to the greater area of vascular disruption required when a mastectomy is performed. Excessively long flaps should be avoided, as should wound closure under tension. Careful pre-operative planning will identify patients at risk for large defects and facilitate the planning of autologous tissue cover.

Evidence suggests that the use of cautery is associated with an increase in the incidence of flap necrosis. Increased thrombosis of subdermal vessels caused by cautery results in relative ischaemia of skin flaps.³

Furthermore, wound healing is a complicated process. Factors contributing to or complicating the wound healing process include body habitus, age, co-morbidities, prolonged operative time, collagen disorders, infection, past radiation exposure, immune status and steroid use. The authors' findings of significantly higher complication rates in those patients with co-morbidities are therefore not surprising. However, it is unclear whether nitroglycerin was beneficial in this cohort of patients, as the majority of patients with diabetes mellitus and hypertension fell into the control group.

There is currently no standard for evaluating skin flaps intra-operatively and no method to quantitatively evaluate mastectomy skin perfusion. Techniques currently utilised to evaluate mastectomy flap viability intra-operatively range from crude, subjective methods such as detection of skin discoloration, evaluation of 'bleeding edges' and assessment of capillary refill, to more sophisticated methods: the intravenous sodium fluorescein test (Wood's lamp method), near-infrared spectroscopy and transcutaneous electrical nerve stimulation (TENS).⁴

Without detracting from the authors' conclusion that nitroglycerin is successful in minimising post-mastectomy skin flap complications, with the added benefits of being cost-effective, safe and acceptable to patients, it is our considered opinion that this is a tedious method and probably not reproducible outside their centre.

Rather than focusing on alternative methods, we maintain that preventive measures to minimise skin flap complications should reinforce basic surgical principles: avoiding skin closure under tension; ensuring adequate perfusion to the flaps by respecting the recommended thickness and length; and minimising the use of cautery, which invariably leads to a degree of burn.

Ines Buccimazza

Yvonne Brakovsky

Breast Unit

Departments of Surgery and Plastic & Reconstructive Surgery

Nelson R. Mandela School of Medicine

University of KwaZulu-Natal

Durban

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