Letters and comments

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COMMENT ON

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N Gulamhuseinwala, S Mackey, P Meagher. Methylene blue dye aids postoperative inflation of breast tissue expanders. *Ann R Coll Surg Engl* 2007; **89**: 638–9

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The intraluminal use of methylene blue in breast expander devices – a word of caution

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In this technique, the authors inject methylene blue dye inside the lumen of the breast tissue expander in conjunction with saline so that the colour of the content turns blue for the easy identification in further injections. Although this provides an easy way to identify the port of entry of the breast tissue expander and make certain of the intraluminal placement of saline solution in future inflation sessions, the technique should not be taken lightly and a few points of caution should be raised before its universal use.

Methylene blue is a tetramethylthionine chloride that belongs to a group of thiazide dyes with close chemical resemblance to phenothiazines.¹ It is a potent inhibitor of guanylate, a target enzyme acted upon by nitric oxide in order to produce endothelium-dependent relaxation effect in shock condition.²

The medicinal use of methylene blue is well known. It is

administered as an intravenous infusion for the intra-operative identification of parathyroid glands due to the selective uptake of the dye by the gland.³ In a small doses (1–2 mg/kg), methylene blue can be used for the treatment of methaemoglobinemia, although in larger doses it can have the reverse effect and introduce the formation of methaemoglobin.⁴ Methylene blue is also used to reverse the adverse effect of nitric oxide and treat patients with anaphylactic or septic shock.^{2,5} In addition, methylene blue is commonly used in sentinel lymph node identification and biopsy in different types of cancer.⁶

Like all chemicals, there is an associated risk of developing adverse effects with the use of methylene blue. It was found in one study that when 3–5 ml of 1% methylene blue was injected intradermally for sentinel lymph node identification in breast cancer, there was a 21% incidence of developing either superficial ulceration or intense erythema at the injection site; therefore, it was recommended the dye be injected deeper in the peritumoural area to avoid such adverse effect.^{7,8} There are also three documented cases in the English medical literature of generalised toxicity effects when the dye is infused intravenously for the identification and localisation of parathyroid adenomas. These systemic effects were in the form of expressive aphasia, confusion, nystagmus, and myoclonic jerks. All three patients made complete recovery within 24–48 h.^{9–11}

The use of breast expanders is associated with the risk of device leakage or complete deflation with the release of the expander contents into the breast pocket. In a 6-year follow-up study of breast reconstruction using saline-filled implants, the incidence of gradual leakage with loss of volume was 38%, while the incidence of sudden deflation that prompted re-operation was 16%.¹² With the development of more modern devices, the incidence may be less but the risk is always there.

The potential release of methylene blue solution inside a body cavity may be associated with a theoretical risk of local and systemic adverse effects. Keeping the amount of the used methylene blue at or below 4 mg/kg (recommended by the UK National Poisons Information Service¹¹ as a maximum safe dose) may be a way to prevent the potential systemic hazard in case of fluid release.

One last point of interest is that we believe the manufacturer device guarantee does not cover the intraluminal use of methylene blue in breast expanders in case of device failure or malfunction.

In general, the benefits of using a technique should always be balanced against its potential risks and, in all cases, patients should be fully counselled to obtain their informed consent.

References

1. Shen WW. A history of antipsychotic drug development. *Compr Psychiatry* 1999; **40**: 407–14.
2. Evora PR, Roselino CH, Schiaveto PM. Methylene blue dye in anaphylactic shock. *Ann Emerg Med* 1997; **30**: 240.
3. Derom AF, Wallaert PC, Janzing HM, Derom FE. Intraoperative identification of parathyroid glands with methylene blue infusion. *Am J Surg* 1993; **165**: 380–2.
4. Wright RO, Lewander WJ, Woolf AD. Methemoglobin: aetiology, pharmacology, and clinical management. *Ann Emerg Med* 1999; **34**: 646–55.
5. Preiser JC, Lejeune P, Roman A, Carlier E, De Becker D, Leeman M *et al*. Methylene blue administration in septic shock: a clinical trial. *Crit Care Med* 1995; **23**: 259–64.
6. Simmons RM, Thevarajah S, Brennan MB, Christos P, Osborne M. Methylene blue dye as an alternative to isosulfan blue dye for sentinel lymph node localization. *Ann Surg Oncol* 2003; **10**: 242–7.
7. Stradling B, Aranth G, Gabram S. Adverse skin lesion after methylene blue injections for sentinel lymph node localization. *Am J Surg* 2002; **184**: 350–2.
8. Thevarajah S, Huston TL, Simmons RM. A comparison of the adverse reactions associated with isosulfan blue versus methylene blue dye in sentinel node biopsy for breast cancer. *Am J Surg* 2005; **189**: 236–9.
9. Martindale S, Stedford JC. Neurological sequelae following methylene blue injection for parathyroidectomy. *Anaesthesia* 2003; **58**: 1041–2.
10. Bach KK, Lindsay FW, Berg LS, Howard RS. Prolonged postoperative disorientation after methylene blue infusion during parathyroidectomy. *Anesth Analg* 2004; **99**: 1573–4.
11. Majithia A. Methylene blue toxicity following infusion to localize parathyroid adenoma. *J Laryngol Otol* 2006; **120**: 138–40.
12. Gylbert L, Asplund O, Jurell G. Capsular contracture after breast reconstruction with silicone-gel and saline-filled implants: a 6-year follow-up. *Plast Reconstr Surg* 1990; **85**: 373–7.

COMMENT ON

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Problems with radiotherapy after immediate breast reconstruction

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Smith highlights the poorer cosmetic outcomes associated with radiotherapy after immediate breast reconstruction; however, a recent study demonstrated potentially significant oncological problems. Mowtani *et al.*¹ reported 110 patients having

immediate reconstruction and post mastectomy radiotherapy, where 52% had a compromise of the radiotherapy protocol compared to only 7% of matched controls. This underlies the reluctance that many surgeons have in recommending immediate reconstruction, 52% in one UK survey.²

Those opting for immediate reconstruction have a higher incidence of psychosocial impairment and functional disability.³ In one of the few prospective studies there was no significant difference in the psychological morbidity of patients undergoing immediate or delayed reconstruction after 1 year.⁴ Therefore, the surgeon needs to bear this in mind when communicating the options available to the patient, who often would have preferred more time to make such a difficult decision.⁴ This is particularly true as we move from selecting the operation, to being a facilitator for the patient, as suggested by the increasing discussion of reconstruction with breast surgery patients from 55% in 1991 to 88% in 2000.²

References

1. Motwani SB, Strom EA, Schechter NR, Butler CE, Lee GK, Langstein HN *et al*. The impact of immediate breast reconstruction on the technical delivery of postmastectomy radiotherapy. *Int J Radiat Oncol Biol Phys* 2006; **66**: 76–82.
2. Callaghan CJ, Couto E, Kerin MJ, Rainsbury RM, George WD, Purushotham AD. Breast reconstruction in the United Kingdom and Ireland. *Br J Surg* 2002; **89**: 335–40.
3. Roth RS, Lowery JC, Davis J, Wilkins EG. Quality of life and affective distress in women seeking immediate versus delayed breast reconstruction after mastectomy for breast cancer. *Plast Reconstr Surg* 2005; **116**: 993–1002.
4. Harcourt DM, Rumsey NJ, Ambler NR, Cawthorn SJ, Reid CD, Maddox PR *et al*. The psychological effect of mastectomy with or without breast reconstruction: a prospective, multicenter study. *Plast Reconstr Surg* 2003; **111**: 1060–8.

AUTHOR'S RESPONSE

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The issues raised by Wallace are of course relevant but a detailed discussion of each was outside the limits of this article. The article cited Motwani *et al.*¹ has limited clinical validity to current UK practice for many reasons. Internal mammary chain irradiation is not routinely practised or recommended in the UK.² If the internal mammary chain is excluded from the field this led to a reduction in those deemed to have received 'compromised' radiotherapy by over 50%.