



Methylen blue dye related breast skin necrosis requiring mastectomy: Case report

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ABSTRACT

Sentinel lymph node (SLN) biopsy is accepted as the gold standard procedure for assessing the status of the axillary lymph node in clinically node-negative breast cancer. The intraoperative blue dye injection is commonly performed to localize the SLN. Systemic allergic complications related to blue dye injection have been well documented, but local adverse effects requiring surgical excision are extremely rare. We report an infrequent case of skin and subcutaneous tissue necrosis following subdermal injection of methylen blue (MB) dye. A 48-year-old female, diagnosed with infiltrating ductal carcinoma, was treated by her initial surgeon with lumpectomy and SLN biopsy. For identification of the SLN, periareolar subdermal injection of 4 ml of 1% MB dye was performed. The patient was seen 10 days following discharge when it was noticed that the periareolar injection sites in the left breast had become necrotic. Since the necrosis invaded the majority of breast, mastectomy had to be performed. Histopathologic examination revealed necrosis of the skin and subcutaneous tissue of the left breast. Although the use of MB dye for SLN biopsy in breast cancer has few systemic reactions, its use has been associated with a number of undesired local complications. Deep parenchymal injections are recommended in order to avoid blue dye-associated skin lesions.

Key words: Blue dye, local complications, sentinel lymph node

Introduction

Axillary lymph node status is one of the most important prognostic factors for the breast cancer [1]. For this reason, it is essential to clarify the axillary stage of the disease in order to plan the adjuvant therapy, including chemotherapy and radiotherapy. The traditional approach was the classic axillary dissection (AD), which meant the removal of at least 10 lymph nodes from the regions of Level I and Level II. Today, sentinel lymph node (SLN) biopsy, a much less invasive

procedure, is accepted as the gold standard technique and has replaced AD for determining the axillary stage of breast cancer. Thus, many complications including lymphedema, seroma, paraesthesiae, pain syndrome related to AD can be avoided.

Blue dye or radioactive agents are the most commonly used tracers. The radio-isotope, which requires advanced equipment and specialists, is a time consuming and expensive technique. Therefore, blue-dye is the preferred method in many centers, since it is afford-

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able and easily applicable. Methylene blue (MB) dye is one of the most frequently used dyes for this purpose. Even though these tracers are safe enough, systemic allergic complication of the procedure have been well documented [2,3]. On the other hand, there have been limited studies reporting local adverse effects related to the blue dye. We report a rare case of breast skin and subcutaneous tissue necrosis following subdermal injection of MB dye.

Aim

The aim of this study is to present a very rare case of blue-dye related skin and subcutaneous tissue necrosis requiring mastectomy.

Case Report

A 48-year-old female presented to her initial surgeon with the complaint of a palpable mass on her left breast. Her past medical history and family history did not reveal any risk factors related to breast cancer. After a series of diagnostic work-up, she was diagnosed with infiltrating ductal carcinoma and was treated by her initial surgeon with breast conserving surgery and SLN biopsy. For the localization of the SLN, an intraoperative periareolar subdermal injection of 4 ml of 1% MB was performed. During the operation systemic, allergic reaction was not observed. The histopathologic examination of the SLN was reported as reactive. The patient was discharged at post-operative 2nd day without any early post-operative complications. She was then observed 10 days following discharge, when it was noticed that the periareolar injection sites in the left breast had become necrotic (Figure 1). Given the wide necrotic area in her left breast, the patient was sent to our tertiary center. Magnetic rezonans imaging was carried out to exclude



Figure 1. Skin and subcutaneous tissue necrosis of the left breast secondary to injection of methylene blue dye for sentinel lymph node biopsy.

a residual or multifocal/multicentric cancer. Due to the inflammation related to skin necrosis, imaging methods could not give additional information regarding the residual disease. Since the necrosis invaded the majority of breast, a mastectomy had to be performed. Histopathologic examination revealed necrosis of the skin and subcutaneous tissue of left breast. There were not any tumor foci or residual disease in the remaining breast specimen. The patient was discharged on post-operative 7th day without complication.

Discussion

Axillary lymph node status is one of the determinant factors in the management of breast cancer [4]. Since it is less invasive and has a lower rate of post-operative complication (lymphedema, seroma, paresthesia, pain syndrome, etc.,) when compared to AD, SLN biopsy has been the gold standard technique in assessing axillary lymph node metastasis in clinically node negative breast cancer [5]. Today, radioactive colloid and blue dye injections are the most popular two options for SLN biopsy. Injection of the radioactive colloid is not only time-consuming and expensive, but also requires more specialists and advanced instruments. Thus, blue dye mapping is the most common technique for SLN biopsy, since Giuliano et al. first described it [6]. One prominent disadvantage of blue dye mapping is the longer learning curve. Therefore, many institutes use the combination of blue dye and radioisotope during the learning curve, but after standardizing the technique, they continue with blue dye alone.

MB, isosulphan blue (ISB) and patent blue V are the most commonly used substances for the SLN biopsy procedure [7]. Moreover, different type of injection techniques have been described (intradermal, subcutaneous, intraparenchymal, peritumoral or intratumoral). Each one of these dyes and infiltration techniques has its own advantages and disadvantages. For example, when compared to the others, the ISB dye has a higher rate of systemic allergic reactions, which can result in cardiovascular collapse [8]. In a review of 2392 patients at the Memorial Sloan-Kettering Cancer Center, Montgomery, et al. reported that 1.6% of patients developed allergic reactions to ISB [9]. Although the use of ISB for axillary mapping has remained the preferred dye, its widespread use has become questionable due to

its increasing systematic complications.

MB has rare systemic complications; on the other hand, its use has been associated with a number of local complications, including skin and subcutaneous tissue necrosis, skin eruptions, and abscess formation [8]. One of the highest rates of local complications related to intradermal MB injection was reported by Stradling et al. [10]. They found that 5 of 24 breast cancer patients (21%) who underwent MB dye injection for SLN developed skin lesions, including superficial ulceration or intense erythema at the dye injection site. In a study of 398 patients, Zakaria et al. reported similar local complications related to MB dye injections, such as local infection (5%), skin necrosis (1.25%) and hypersensitivity of the skin (0.5%). Among the above-mentioned local complications, only one case underwent surgical excision; all the others were treated with conservative methods [11]. In our case, we had to perform a mastectomy due to wide skin and subcutaneous tissue necrosis. In fact, the patient was a good candidate for immediate reconstructive options, but due to the probability of adjuvant treatment, including radiotherapy and chemotherapy, we preferred late reconstruction. MB has significant advantages, particularly its low cost, even when compared to other dyes. For example, ISB is 80 times more expensive than MB. Therefore, MB has been widely used around the world.

Conclusion

When using MB dye for SLN biopsy procedure, deep parenchymal injections are recommended, and intradermal or subcutaneous injections should be avoided in order to prevent associated skin lesions. Surgeons should be aware of the local complications of MB at injection sites for early diagnosis.

Conflict of interest statement

The authors have no conflicts of interest to declare.

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