Supplemental oxygen therapy in bleomycin-induced pulmonary toxicity

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Dear Editor,

I read with interest the case report “Reversible Bleomycin Toxicity”.¹ The authors have mentioned high-dose oxygen exposure as one of the risk factors for pulmonary toxicity. This is an important aspect of Bleomycin-induced pulmonary toxicity, as supplemental oxygen therapy is considered to be a synergistic toxin with Bleomycin, particularly in the setting of general anaesthesia and hyperbaric oxygen therapy (HBOT). The dosage of oxygen which can result in toxicity has not been quantified. Even a modest increase in fraction of inspired oxygen (FiO₂) to 0.32 or 0.45, intra-operatively, has reportedly resulted in lung toxicity and death.² Further, the duration of this relationship is not well characterised. An exposure to Bleomycin in the past six months is considered by some to be a significant risk factor;² however for delivery of HBOT, even a remote history of Bleomycin therapy is an absolute contraindication.³

In patients with history of exposure to Bleomycin, requiring oxygen administration, inspired oxygen concentration is recommended to be kept at the lowest level, typically at FiO₂ of 0.22–0.25, that provides adequate tissue oxygenation. A single breath, carbon monoxide diffusion capacity (DLco) is considered to be the most predictive of potential pulmonary toxicity where HBOT is being considered.⁴

The authors in their case report have not described if the patient received any supplemental oxygen therapy after the administration of Bleomycin. Also, they report that the initial

pulmonary function test revealed moderate restrictive defect with impaired gas exchange, and the repeat pulmonary function test was normal. It has not been mentioned if DLco was performed and how significantly it improved after resolution of lung lesions. The finding of improved DLco may have a positive bearing if the patient subsequently requires supplemental oxygen therapy for any reason.

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REPLY

At the outset, on behalf of all the authors, I thank the reader for having shown keen interest in the article entitled “Reversible Bleomycin Toxicity” published in the July issue of MJAFI.¹ The reader has brought out clinically relevant and important issues pertaining to exacerbation/precipitation of bleomycin-induced pulmonary toxicity caused by supplemental oxygen administration particularly in the context of general anaesthesia. As mentioned in our article, exposure to high-dose oxygen is one of the several important risk factors known for development of bleomycin pulmonary toxicity. We did not go into the details of the risk factors of bleomycin toxicity as our article focused mainly on the unusual HRCT features of bleomycin toxicity and imaging (HRCT) demonstration of reversibility of the lesions. I agree with the comments of the reader concerned with regard to the potentially serious synergistic effects of supplemental oxygen therapy in a patient with prior exposure to bleomycin. Exposure to bleomycin appears to sensitise the lungs and potentially fatal acute lung damage can occur at an inspired oxygen

concentration which is otherwise considered normal for a healthy individual. However, this issue is debatable.^{2,3} Nevertheless, it may be clinically relevant as many of the patients who receive bleomycin therapy for a variety of disorders are relatively young and may subsequently undergo surgery where general anaesthesia would be considered. Awareness and knowledge of these risk factors would certainly prove invaluable in preventing/avoiding perioperative complications in a patient with prior exposure to bleomycin. At this point, I would like to mention that the issue of perioperative reduction of oxygen in patients with prior exposure to bleomycin is also debatable.^{4,5}

There are conflicting reports regarding the role of pulmonary function tests and carbon monoxide diffusing capacity (DLco) as an indicator of bleomycin-induced pulmonary toxicity.^{6,7} However, the general consensus is that DLco has an important role in this regard. As enquired by the reader, I would like to inform here that our patient did not receive any supplemental oxygen therapy after the administration of bleomycin. At the

last review, which was approximately six months after stoppage of bleomycin, the individual was asymptomatic, a repeat pulmonary function test was normal. Repeat DLco test was done and was normal. After going through the existing literature and the pertinent comments of the reader, I think, it may be worthwhile to document in the medical records as well as personal health card and also brief the patient/care taker concerned on the recent exposure to bleomycin and possible potential complications if need arises for supplemental oxygen therapy or general anaesthesia for any reason in future. This may be particularly relevant for the Armed Forces population who move from place to place.

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