Bone cement implantation syndrome affecting operating room personnel

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Editor—We read with great interest the recent article by Olsen and colleagues concerning ‘Bone Cement Implantation Syndrome’ and its characteristics and applaud their research efforts. The authors stated that the ‘syndrome’ is comprised of hypoxia, hypotension and loss of consciousness around the time of implantation. Patients may manifest pulmonary hypertension and arrhythmias, which could even lead to cardiac arrest.

Their retrospective study does not mention the type of anaesthetic administered to these patients. Older patients with co-morbidities are more prone to suffer from the implantation syndrome. Young and healthier patients are able to fight off the ‘syndrome’ better.

We wish to add some thoughts and information to the ‘syndrome’ which many anaesthesia providers may not be aware of, or have forgotten.

Bone cement is hazardous to the patient, but also to the ‘team’ operating on the patient. The surgeon, scrub nurse, circulating nurse and anaesthesia provider are also in some danger because the cementing produces a pungent vapor into the operating room, that will be inhaled by all participants in the room if not properly ventilated. Should the ‘team’ operate often doing these type of cases, the cementing can lead to the following ill effects:

- Eyes, Nose, and Throat: Vapor in the air at a level of 125 ppm may cause teary eyes, sore throat, coughing, and irritation of your nose.
- Skin: direct contact with liquid can cause itching, burning, redness, swelling, and cracking of the skin. Repeated skin contact can cause dermatitis (skin rash). Allergic reaction can occur. Prolonged skin contact may cause tingling, numbness, and whitening of the fingers. Methyl methacrylate (MMA) easily penetrates most ordinary clothing and can also penetrate surgical gloves.
- Nervous system: overexposure affects the brain the way drinking alcohol does. Symptoms may include headache, drowsiness, nausea, weakness, fatigue, irritability, dizziness, and loss of appetite and may also cause sleeplessness.
- Reproductive system: some studies have suggested that MMA can cause birth defects when pregnant animals are exposed to extremely high levels. It is not known whether MMA can affect pregnancy in humans. Women who may be pregnant should avoid overexposure.

There are no laboratory tests to accurately measure the amount of MMA in the body, or identify any damage that MMA exposure might cause. Periodic follow-up examinations are recommended. Most people can smell methyl methacrylate when the concentration in the air is well below 100 ppm. Containers should be tightly covered to prevent evaporation. Local exhaust ventilation systems ‘hoods’ are the most effective type of ventilation control. It is recommended to capture contaminated air at its source. A local exhaust system with laminar flow should be used. Vapors scavengers must be installed in operating rooms where MMA is used. Personal Protective Equipment such as gloves, goggles, or a face shield should be worn. Protective clothing should be made of MMA resistant material.

Declaration of interest
None declared.

References

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