Use of glass bead sterilizer in rodent survival surgery

Few studies have been published on the use of glass bead ("hot bead") sterilizers (GBS) in aseptic rodent surgery. These studies conclude that complete sterility is not achieved using GBS unless thorough cleaning of the instruments is performed before use of GBS. Furthermore, CDC's Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008 (updated June 2024) states that "FDA believes there is a risk of infection with this device because of potential failure to sterilize dental instruments and their use should be discontinued until the device has received FDA clearance". Based on this, AEM does not consider GBS appropriate as the sole method of sterilization in aseptic surgery but acknowledges the need for re-sterilization in rodent batch surgery. GBS is not acceptable as an initial method of sterilizing instruments. If GBS is used in rodent survival batch surgery, certain principles must be followed, and users must be aware of the limitations of maintaining asepsis when using GBS.

General

- GBS must be used according to the manufacturer's instructions regarding temperature, contact times of the instruments with the beads, cleaning, level of beads in the well, replacement of beads, service, etc.
- Do not overload the well with instruments.
- GBS may not be suitable for instruments with complex shapes or hollow components, as these may not achieve proper decontamination.
- The well must be covered with a lid when the GBS is turned off to protect it from dirt and debris.
- GBS only re-sterilizes the tips of the instruments.

How to use GBS in rodent survival surgery

- Instruments must initially be sterilized using acceptable methods of sterilization e.g. autoclavation, irradiation, ethylene oxide or similar.
- One set of instruments can be used for a maximum of five animals, provided that the instrument tips are cleaned of debris with an ethanol wipe prior to insertion into the well.
- If instrument tips become contaminated by contact with a non-sterile surface (e.g., tabletop, fur), the tips may be re-sterilized using GBS.
- If instrument tips become contaminated by the gastrointestinal tract or other gross contamination, a new sterile set of instruments must be used.
- Instrument tips reach very high temperatures in the GBS and must be cooled down before use (e.g., in a cup with sterile water). This process requires at least 15 seconds but may take longer. Using hot instruments will cook the tissue.

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Special consideration when applying “tips-only” technique

- If a “tips-only” technique is applied, only the tips of the instruments are sterile after the initial handling, which restricts the surgeon to using only the sterile tips to manipulate the surgical field, including but not limited to tissue, sutures, needles, and sterile devices.
- Attention must be paid when instruments are laid down, as the tips are sterile, but the handles are non-sterile. Sterile tips must only be placed on sterile surfaces, e.g., on a sterile drape. See the example below.

Using the 'tips-only' technique, the sterile instrument tips must be placed on a sterile surface, while the non-sterile handles should be placed on a non-sterile surface. The blue box indicates a sterile field, such as a drape.

References

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CDC’s Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008. Update: June 2024 (accessed March 10, 2025)