

Regular Checks Of High Vaccum Sterilizers

(A New Method)

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POST-OPERATIVE infections including tetanus are rare but fatal complications after elective surgery. The need of proper sterilization of all the articles taken into the operation theatre is well known and need not be stressed again and again. In spite of the modern sterilization techniques, no shoe zones, and better ventilation and air conditioning systems, cases of post-operative infections following elective surgery have been reported from leading hospitals. (Mehindiratta, et al; 1970). An incidence of (.74%) has been reported from a leading hospital in India. (Patel et al; 1960.) However, Robbo from Australia reported an incidence of 11% in 1958. Apart from the reported cases we find postoperative infections quite common after elective surgery. Whenever such an episode happens the blame comes at once on the efficacy of the sterilizers. And the performance of sterilizers is checked and rechecked by complicated electrical equipments.

However such tests and checks by the costly electrical equipments cannot be had routinely, and need for a simple but reliable test for day to day use is always felt. Hereunder we describe such a reliable and simple test, known as 'Bowie and Dick' Autoclave Tape test. This test does not need any sophisticated instrument and can be used as a routine test for checking the Sterilizers.

Materials And Method

A standard testpack is made up of towels. Each towel is folded into eight or six thickness and is placed one above the other to make a stack about 11" high. A white sheet of paper of the size of the folded towels is taken and an autoclave tape is applied to it in the form of St. Andrew's cross. We used the 3M. Brand Autoclave tape No. 1222. The sheet of paper is placed in the middle of the stack. The paper used should not be waxed or grease proof. Next the stack is carefully wrapped in gauze to ensure that the towels stay in position during handling.

The test pack is placed in the sterilizer by itself and is subjected to a standard sterilizing cycle. The sterilizing time must not be more than 12 minutes if a temperature of 126°C, is being used and no more than 3½ minutes if a 134°C, is being used. At the end of the cycle the towels are taken out carefully and the paper with the tape is examined. After a satisfactory run the colour changes on the paper tape should be the same at the centre as well as at the edges. A paler tape at the centre than at the edges indicates unsatisfactory run and the sterilizer should be looked into for the same. Papers with the tape are marked with date and time of test and kept for reference.

Discussions

High Vaccum sterilizers being used in the hospitals have reduced the time needed for sterilization to as low as 15 minutes. But the efficacy of the sterilizers is often questioned in case of post-operative infections after elective surgery. Specially when there is a series of such infections or a case of tetanus is reported from the postoperative wards. Such questioning is quite justified keeping in view the high mortality rate. Bunch and Quattlebaum have reported in 1943 a rate as high as 87.5%, and very recently it has been reported to be 66.6% from three leading hospitals of Delhi. (Mehindirata et al 1970.) Post-operative tetanus can be due to several factors, tetanus bacilli and their spores have been found in various materials, such as in cotton wool (Puluertaf. 1937. Goodhart and McIntosh 1933, Cane 1938., Johnson, 1956), in talcum powder (Sevitt. 1949), in sulphonamide powder (Welch et al 1942). Samples of an operation theatre air also showed presence of tetanus bacilli (Lowbury and Lilly 1958). However modern methods of air filtration and bubbling it through water has reduced this risk.

In spite of all these the sterilizers are blamed and sometimes rightly for the postoperative infections. Although the modern high Vaccum sterilizers are reliable enough a periodical check makes them more so. In such sterilizers the steam is made to penetrate porous loads instantaneously, and all the air present in the chamber is removed beforehand. However if

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due to some fault in door seals, valves or pumps, air is not removed properly, steam will only penetrate the load slowly and in an irregular way, resulting into unsterile dressings. Thus it becomes necessary to test the sterilizers regularly.

The 'Bowie and Dick' autoclave tape test described above is a simple, cheap and reliable test to meet such need. The tape shows a colour change related to time and temperature on exposure to steam. When all the air has been removed the team penetrates, rapidly and completely; thus the tape shows a uniform colour change. In case the air is still present in the sterilizer when steam is admitted for sterilizing, it is forced into the centre of the pack, where it collects as a bubble, and due to the low temperature in the area of bubble. If more air is to be removed the test will be more exacting and that is why the test pack of towels is used by itself in an empty chamber. The density of colour change is not important, as it can be effected by the storage conditions of the tape. What is more important is that the same colour change occurs at the edge and centre. The contrast in colour change from centre to edges will be reduced to an unreadable level if long sterilizing periods are used. That is why the sterilizing period must not exceed 3½ minutes at 134°C. Even one extra minute can seriously effect the comparison of results. Thus it is very clear that if a sterilizer fails in the Bowie Dick test it cannot be made safe by increasing the time of sterilization.

Summary

Need of regular checks of the modern high vacuum sterilizers is discussed, and a reliable simple test known as 'Bowie-Dick' test is described for knowing the performance of high vacuum dressing sterilizers. (Courtesy Hospital Administration)

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