

### A SIMPLE ADAPTATION OF A HEIDBRINK CIRCLE ABSORPTION HEAD (NO. 9B) FOR THE ADMINISTRATION OF MIXTURES OF TRICHLOROETHYLENE AND AIR

With the sudden rise in popularity of trichloroethylene analgesia in the United States, many physicians and hospitals have wanted to use it. They have been hindered by the necessity for buying special and expensive equipment designed especially and only for the administration of trichloroethylene. Being in a similar situation, I looked for a means of administering trichloroethylene-air mixtures with equipment that was available to me at the time. The solution was much simpler than expected. The accompanying text illustrates how the circle absorption head (No. 9B) of any standard Heidbrink anesthesia machine can be adapted at no cost whatsoever for the administration of trichloroethylene-air and trichloroethylene-nitrous oxide analgesia and anesthesia.

This adaptation can be accomplished by carrying out the following steps. (1) Transfer the ether vaporizer unit, without the wick, from the expiratory side (right, facing the machine) to the inspiratory side (left) of the circle absorber. If an extra vaporizer unit is available, it may be placed on the inspiratory side. With a vaporizer on each side, both ether and trichloroethylene may be administered from the same machine without changing jars. A special jar or vaporizer is not necessary. (2) Remove the rebreathing bag from the bottom of the absorber. (3) Turn the carbon dioxide absorption chamber to the "shut" position. (4) Close the valve for inflating the lungs, attached to the expiratory valve (right side), by placing it in the up position. I attached a labeled tongue depressor to the valve handle to facilitate its use and explain its function. (5) Open either the "pop-off" valve on the face inhaler Y-piece or the pressure limiting valve on the circle absorber. (6) Remove the wick from the vaporizer jar (if not already done) and place 15 to 30 cc. of trichloroethylene in the jar. The anesthesia machine is then ready for use.

An airtight fit of the mask on the patient's face is important. As the patient inhales, air is drawn into the circle absorber

through the opening for the breathing bag. It passes through the carbon dioxide absorber (without coming in contact with soda lime), through the one way valve on the inhalation side of the absorber, and into the vaporizer. From here it passes through the inhaler tubing and hence to the patient. On exhalation, the valve for inflating the lungs and the inspiratory valve in the absorber prevent passage of gas back into the absorber. All expired gases will pass out into the atmosphere through one of the "pop-off" valves.

This arrangement may be used either for self administration or for administration by an anesthesiologist. With the vaporizer turned to the "full open" position it is very difficult to achieve anesthetic concentrations of trichloroethylene in air although analgesia can be accomplished easily with the vaporizer set at the 5 or 6 position.

If it should become necessary or desirable to supplement the trichloroethylene with nitrous oxide and oxygen, it can be done easily and quickly by following these steps in this exact order. (1) Return the valve for inflating the lungs to the open (down) position. (2) Replace the breathing bag on the circle absorber and quickly inflate the bag with oxygen so the patient will not experience the sensation of inhaling against an empty bag. (3) Turn on the desired flows of nitrous oxide and oxygen (nitrous oxide 60 per cent and oxygen 40 per cent is usually sufficient). Elimination of carbon dioxide is obtained by a flow of gases equal to or greater than the minute volume respiration of that patient.

When trichloroethylene-air is being used, no trichloroethylene comes in contact with soda lime. The safety of using trichloroethylene and nitrous oxide in a semiclosed system, with respect to soda lime and the formation of dichloroacetylene, lies in being absolutely certain that when the carbon dioxide absorption canister is turned off, the metal fittings in the canister are snug enough so that no gas enters the soda lime chamber. A notice was placed on my machine to remind me of this constant danger.

The technique of administration is simple. During the induction, the concentration of trichloroethylene is gradually increased until the vaporizer is completely open or the desired stage of analgesia is reached. Maintenance of a satisfactory level of analgesia is usually possible with a vaporizer setting of 5 or 6. I have used this method many

times in obstetrics and in minor and major surgical procedures and have found it extremely useful whenever trichloroethylene is desired.

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