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CHLOROFORM AS AN ANÆSTHETIC—ITS PHYSIOLOGICAL ACTION AND THERAPEUTIC VALUE.*

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It may be well at the outset, in view of its being often forgotten by some surgeons, to call attention to the fact that physiological respiration in man is performed either through the mouth or nasal fossæ, —never simultaneously through both. It is therefore a mistake of the chloroformist to believe that, if the mouth be left open and uncovered during nasal inhalation the patient will inspire sufficient air to dilute the anæsthetic to the standard of safety, or that the holding of the nose during buccal respiration will hasten anæsthesia. Such phenomena could only occur in the presence of peculiar pathological conditions of the soft palate, or pharynx, or of both.

The immediate local effects of chloroformic vapor on the air passages are of a stimulating nature: those portions of the mucous membrane which minister to special sense are thus placed in the highest state of functional impressibility, and, as might be expected, the salivary glands become abnormally active. Large or small volumes of air are usually swallowed with the saliva at this stage; later on we shall enquire why we may also have vomiting. Let us first examine the nervous circle of salivation. Here we find, that through chloroformic stimulation of the glosso-pharyngeal and gustatory end-bulbs a centripetal incitation is generated and conveyed to the gustatory centre in the medulla oblongata, and thence reflected on the auriculo-temporal and chorda-tympani as a centrifugal excitation to the salivary glands. The hypersecretion which follows is of short duration, because the nerve cells of the end-bulbs soon become semi-coagulated and unimpressible. It must not, however, be forgotten or overlooked that such a secretion takes place, and that it may accumulate in the pharynx; consequently we should, in any and every case of accident under chloroform, clean out the mouth and draw the tongue forward.

The remaining portion of the respiratory tract shares equally in the general stimulation, and as the volume of carbonic acid gas exhaled during the period of excitement is greater than normal, we thus have a double cause for pneumogastric irritation. This last is translated by increased frequency of respiration, and the patient's usual attempts to displace the inhaler. Tolerance is soon established, but as the mucous and respiratory membranes are sometimes anæsthetized before sufficient vapor has entered the blood current, the respiratory stimulus is often wanting and the patient may forget to breathe. Let us not attempt, as is often done in such cases, to squeeze the wind out of him; such a proceeding invites cardiac syncope. The sense of hearing, owing to the depth at which its encephalic centre is located, is the last to yield to anæsthetics, and without resorting to physical force, we should, in the case in question, simply tell our patient to "breathe naturally."

When impure chloroform is used for inhalation the patient is almost suffocated by the first inspirations, the veins of the neck and face become turgid, the number of respirations diminished, the pause between inspiration and expiration lengthened, the period preceding anæsthesia prolonged, and the risk of cardiac syncope increased. A chloroformization which begins badly will follow a troublesome course, and require marked attention. "Pure chloroform kills only when badly administered." Unless we use a "Snow's Inhaler," Gosselin's intermittent method of administration is the correct one; but we must ever bear in mind that over 5 per cent. of chloroform in the inspired atmosphere is dangerous, and that 10 per cent. destroys life by completely inhibiting molecular interchange.

Having thus far dealt almost entirely with effects due to local stimulation, we will divide complete anæsthesia into four periods, viz.:—(1) Anæsthesia of the cerebrum, cerebellum and basal ganglia;

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