

EXPIRED-AIR VENTILATION OF THE LUNGS IN THE RESUSCITATION OF THE DROWNED

Cessation of respiration is the primary cause of death in drowning and in certain accidents and poisonings that give rise to muscular paralysis. Within a short time, varying in different cases, the resulting anoxia leads to cardiac failure and death. It is during this short critical period that it may be possible to save life by artificial aeration of the lungs which, of course, is the reason why artificial respiration figures so prominently in first-aid instruction and practice.

For many years, until recently, the first-aid methods of artificial respiration in drowning cases that were universally accepted were those in which by rhythmic inward pressure or outward pull on the chest wall, or two-phase methods of successive push and pull, air was in turn drawn into and pressed out of the lungs. In an article published in this issue of the *Journal*, Dr. D. M. Jowell<sup>1</sup> describes these older methods and advocates the adoption in first-aid practice of a new method, also described, in which the operator rhythmically inflates the lungs of the unconscious apnoeic subject with expired air, the composition of which is such that it can well fulfil the subject's needs in the way of oxygenation and the removal of CO<sub>2</sub>. The operator achieves this by taking a deep breath, placing his mouth over the mouth of the subject (whose nostrils he holds pinched) and blowing the subject's lungs full of air. He then removes his mouth, allowing passive expiration to take place (a phase lasting twice as long as the inflation), and repeats the cycle of inflation and passive expiration about 20 times a minute. During this procedure the subject's airway is kept open by extension of his head and pulling of his lower jaw forwards (i.e. upwards, since he lies in a supine position) by the operator by means of his thumb in the subject's mouth. The operator is able to watch the rise and fall of the chest and to look out for signs of distension of the stomach with air. The procedure is varied to meet special conditions; for instance, with babies and little children, when both mouth and nose are covered by the operator's mouth, and with subjects whose jaw cannot be opened, when the operator covers the patient's mouth and blows into his nose.

A symposium on artificial respiration<sup>2</sup> which was held in the United States in 1951 by the National Academy of Sciences and the National Research Council unanimously reported that the mouth-to-mouth method of resuscitation (expired-air inflation) was superior to the older methods. It achieves an average tidal volume of 1,500 c.c., which is almost twice what can be done by the best of the push-pull methods under the most favourable conditions, and is still more in excess of the usual push-pull results. It has the advantage that it makes it easy to maintain a clear airway, that a close watch can be kept on the air movement achieved and on any gastric distension, and that increased inflation

pressure will compensate for any obstruction that may, for instance, be caused by the position of the tongue or by water in the air passages. The method is very easily learned by lay operators and does not call for great strength or endurance. Women or young persons can ventilate subjects twice their weight, which they cannot do with push-pull methods, and the procedure can be continued for an hour or more without great strain. In view of the importance of the prompt application of artificial respiration once respiration has ceased, when even seconds are of importance, an advantage of mouth-to-mouth ventilation is that, especially with children, it is perfectly feasible to start it in the water while the victim is being brought to land. Some first-aid personnel object to the mouth-to-mouth contact; it can be avoided by the use of a simple tube airway<sup>4</sup> or by inserting an anaesthetic mask between the operator and the subject.

In America the expired-air method of artificial respiration has been adopted by the Red Cross, the fire-fighting organizations, and the armed forces. In South Africa, as in other countries, the push-pull methods are still taught and used by the recognized first-aid bodies, and the time has come when this policy ought to be reconsidered; for 'every investigator . . . has come to the same conclusions, viz. that expired-air resuscitation is the most effective, if not the only effective, emergency method of ventilation, both in lay and medical hands'.<sup>1,3</sup>

The public and the medical profession owe a great deal to the devoted services of first-aid workers and organizations, and it is most desirable that the profession should maintain a close liaison with them in order to ensure that their methods are kept up to date in accordance with advances in medical knowledge. All the methods were originally adopted on medical recommendation, but there is a proneness to conservatism which tends to leave first-aid procedure behind modern advances. This is inevitable unless people in the different branches of medicine take an active interest in first aid. The point is well illustrated by this question of artificial respiration. During the development of methods of anaesthesia much knowledge has been gained in the use of passive inflation of the lungs of the apnoeic subject in order to ensure continuous oxygenation of the tissues. This procedure is a commonplace of the operating theatre, and it is now several years since its application to the resuscitation of the drowned was authoritatively recommended; yet the older methods of artificial respiration which it could with great advantage replace are still standard practice in first aid.

1. Jowell, D. M. (1959): *S. Afr. Med. J.*, 33.
2. Symposium on Mouth-to-Mouth Resuscitation (Expired Air Inflation) (1958): *J. Amer. Med. Assoc.*, 167, 317.
3. Swann, H. G. (1953): *Anesthesiology*, 14, 126.
4. Editorial (1959): *S. Afr. Med. J.*, 33, 983.

## ASPEKTE VAN MODERNE METODES VAN NARKOSE

Gedurende die afgelope aantal jare het die snykundige behandeling van 'n hele aantal toestande wat vroeër feitlik onbereikbaar, en dus feitlik onbehandelbaar was, groot vooruitgang gemaak. Enersyds was hierdie vooruitgang moontlik as gevolg van verbeterde snykundige tegnieke en ook as gevolg van die ontwikkeling van beter insig in die betrokke fisiologiese en patologiese prosesse in die algemeen. Dit laat egter geen twyfel nie dat die moderne metodes van narkose 'n deurslaggewende rol gespeel het daarin om hierdie vooruitgang moontlik te maak. In hierdie verband dink ons veral aan die vooruitgang wat daar gemaak is op die gebiede van torakale chirurgie, neuro-chirurgie, operasies op baie jong kindertjies, en groot chirurgiese prosedures in die algemeen.

Die soort narkotiese praktyk waarna ons hierbo verwys het, het natuurlik hoofsaaklik betrekking op die werk van spesialis-narkotiseurs. Dit is werk wat grotendeels in die grotere dorps- en stedelike gebiede gedoen word teen die agtergrond van redelik-bevredigende hospitaalfasiliteite.

Uit die aard van die saak is dit egter in Suid-Afrika so gesteld dat 'n groot persentasie van die aantal narkoses wat jaarliks toegedien word, deur plattelandse algemene praktisyns behartig word. In die loop van 'n ondersoek wat dr. Jones<sup>1</sup> onlangs ingestel het, het hy tot die gevolgtrekking gekom dat nagenoeg 900,000 narkoses elke jaar deur dokters toegedien word wat nie spesialiste is nie.

Hierdie bevinding hou baie belangrike implikasies vir ons in. In die eerste plaas moet dit ons aandag vestig op die belangrikheid van die dosering van narkose as vak gedurende die tydperk van mediese opleiding. In 'n artikel wat vroeër al verskyn het, het dr. Jones<sup>2</sup> ook hierdie aspek van die saak ondersoek. Hy voel dat ten spyte van die gedurige aandrag om meer vakke by die mediese leerplan in te lyf, die belangrikheid van narkose beklemtoon moet word. En, al is dit duidelik dat 'n voorgraadse student nie in 'n spesialis-narkotiseur omgeskep kan word nie, moet daar seker gemaak word dat elke mediese student grondige kennis dra van die gewone narkotiese prosedures wat elke dag toegepas word.

Dit bring ons by 'n verdere oorweging. Die wanopvatting het ontstaan dat goeie metodes van narkose noodwendig die

gebruik van ingewikkelde apparaat veronderstel. Dit is nie noodwendig die geval nie. Dit is wel waar dat ingewikkelde apparaat en gevorderde metodes onder sekere omstandighede deur spesialis-narkotiseurs gebruik moet word. Maar, daar is 'n sterk saak uit te maak vir die vereenvoudiging van sowel die tegniek van narkose as die apparaat wat gebruik word.

Ons het onlangs in hierdie *Tydskrif* 'n artikel geplaas deur dr. Lambrechts<sup>3</sup> waarin hy aantoon dat die lywige en ingewikkelde apparaat vir narkose wat gewoonlik in hospitale gebruik word, nie noodsaaklik is vir die behaal van sukses op hierdie gebied nie. Een van die opvallende kenmerke van die metode en apparaat wat hy beskryf, is dat dit nie afhanklik is van 'n hele aantal gassilinders wat gehanteer moet word nie, aangesien die narkosemengsel net met lug toegedien word. Die waarde hiervan is onbetwisbaar in lande waar silinders met suurstof en stikstofsoboksied nie verkrygbaar, of maklik vervoerbaar is nie, of waar die koste van hierdie gasse te hoog is. Die nuwe soort inasemingsapparaat vir narkose wat dr. Lambrechts beskryf, kan werklik 'n revolusie in die mediese wêreld teweegbring.

In sy ontleding van die aantal sterftes as gevolg van die toediening van narkose, kom dr. Jones<sup>1</sup> tot die gevolgtrekking dat daar in ons land gedurende 1957 waarskynlik ten minste 200 persone gesterf het as gevolg van die narkose wat hulle ontvang het. Sterfte as gevolg van narkose bly dus, ten spyte van die groot vooruitgang wat daar wel in hierdie vertakking van die medisyne gemaak is, 'n belangrike publieke gesondheidsprobleem. En alhoewel dit die geval is dat ons nooit die sterftesyfer van die toediening van narkose tot nul sal kan herlei nie—omdat daar te veel onbekende en onberekembare faktore is—sou ons deur noukeurige toepassing van die kennis wat ons wel het, daarin kon slaag om die sterftesyfer tot 'n minimum te reduseer. Ons het hier dus te doen met 'n probleem wat tuis hoort by die mediese opvoeders, die algemene praktisyns, die spesialiste, sowel as by die algemene publiek, en wat 'n groot belofte van sukses inhou as dit verstandig en met toewyding aangepak word.

1. Jones, C. S. (1959): S. Afr. T. Geneesk., 33, 1036.

2. *Idem* (1959): *Ibid.*, 33, 797.

3. Lambrechts, W. en Parkhouse, J. (1959): *Ibid.*, 33, 1036.