

## PROBLEMS IN ANAESTHESIOLOGY FOR THE AGED

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To TALK about any of the problems of old age has until recently seemed to me like talking of the problems of people of a foreign country. Now as I myself am within sight of the mythical borderline of "three score years and ten," I suddenly realize I am talking about matters which concern people just like myself. This brings me to my first declaration, namely, that so far as anaesthesiology is concerned, there are no problems particularly associated with old age. What I mean to say, of course, is that the dangers and hazards associated with anaesthesia in the aged are the same dangers and hazards met with when one is dealing with those who are still in the so-called prime of life (whenever that may be). The only difference I can see in the anaesthetic management of the aged is that it is more than ever important to uphold the principles of good anaesthesia. Unfortunately, one can sometimes get away with careless, slipshod methods when dealing with robust young patients. With the aged the same carelessness might mean disaster. But whenever really good anaesthesia is available it is never true to say that a patient is too old to take an anaesthetic. If there is even a flicker of life, good anaesthesia will sustain it, and may indeed even support life over long periods of crisis.

What, then, are the dangers and hazards associated with anaesthesia which must be particularly avoided in old age, and what are the principles of good anaesthesia to which one should adhere so assiduously? The dangers include (1) insufficient oxygen, (2) improper elimination of carbon dioxide, (3) fluid and electrolyte imbalance, (4) toxicity from drugs, (5) nerve palsies, (6) psychic trauma and all sorts of other iatrogenic effects.

Let us for a few moments examine these dangers to which old people may be subjected, and see how they may be averted:

1. *Hypoxia* or insufficient oxygen may result from obstruction of the airway, and this may be due to excessive secretion anywhere along the respiratory tract, to obstruction of the glottis by the tongue, to a kinked or too small endotracheal tube, to aspirated gastric contents, or to inflammatory swelling. The remedy in all these situations is to obtain a free and unobstructed airway, and the easiest way to make sure that this can always be established in old people is by the almost routine use of endotracheal anaesthesia. Intubation is not a difficult art, particularly now that we possess easily administered muscle-relaxing drugs, and the endotracheal tube has become for the anaesthesiologist a veritable lifeline. Indeed, so important is the establishment of an unobstructed airway in all unconscious patients, whether or not unconsciousness is due to anaesthesia, that I believe every general practitioner should carry as part of his equipment a

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laryngoscope and endotracheal tube and know how to use them. It is not even necessary to have a cylinder of oxygen, for "God's oxygen" is all around us in 20 per cent concentration! Few lives are saved by oxygen which could not also have been saved by the timely and effective use of air. But a free airway to the lungs is needed.

2. The second danger is *hypercarbia* or the retention of too much carbon dioxide. There are two equally important parts of pulmonary ventilation—getting oxygen into the lungs and getting carbon dioxide out. We are now realizing that an increase of CO<sub>2</sub> above normal physiological limits may lead to many unfavourable consequences. The elimination of carbon dioxide requires active respiration. Many drugs used in modern anaesthesiology depress respiration. Therefore it is imperative that we assist or control respiration in order to keep the CO<sub>2</sub> level normal. For this reason we must have available efficient apparatus for the chemical absorption of CO<sub>2</sub> in closed or semi-closed circuits and mechanical ventilators for use in long operations or in any situation where the patient needs to have his respiration supported. Hypercarbia should no longer be a problem, provided it is recognized and proper measures taken. Patients who have been unconscious and in complete apnoea for periods as long as several weeks have recovered with no permanent physiological damage.

3. *Fluid and Electrolyte Imbalance*. In 1919, when I started giving anaesthetics, the state of a patient's blood chemistry was generally unknown, and parenteral fluids were given mainly by submammary infusion. Blood transfusions were as rare as thousand-dollar bills. There is still much that is mysterious about our body fluids, and especially about the intricacies of intracellular metabolism, but I am sure that the survival of many old people after major surgery is due to intelligent application of what we do know about water, sugar, salt, calcium, potassium, iodine, iron, and the hormones and enzymes which regulate these vital elements in our bodies. The wise anaesthesiologist tries to assess the patient on an individual basis, to make allowance for the inevitable changes of old age, to disregard what is not important, and to pay special attention to such vital factors as the maintenance of blood volume.

4. *Toxicity from Drugs*. I shudder sometimes when I see what a multiplicity of drugs are prescribed for one patient. We live in an age of frightening polypharmacy which I hope some day soon may be reduced to a more commonsense level. Multiplicity of drugs is just as much a problem and a danger in anaesthesiology as it is in therapeutics. An anaesthetic agent is not necessarily good because it is new and bad because it is old, or vice versa. In fact individual anaesthetic agents perhaps haven't as much relative advantage or disadvantage as they used to have. What I mean to say is that provided one pays attention to some of the other factors we have been discussing, one can achieve equally good anaesthesia with ether, or halothane, or cyclopropane, or any one of a half dozen other agents.

Nevertheless, when we are dealing with old people there is no doubt that certain anaesthetic agents are less upsetting than others. Ether, traditionally so safe, does act as an irritant and a depressant when used in anything more than minimal quantity, and in my opinion is not the best agent to use with old people.

In fact, if I had no other choice I would prefer chloroform to ether. However, we do have the gases: nitrous oxide, ethylene, and cyclopropane; and whenever a gas can be used it would be my agent of choice. Gases are inhaled easily and rapidly and are excreted through the lungs with equal rapidity. This makes them controllable, and controllability is one of the most potent factors for safety in anaesthesia. For thirty years my favourite anaesthetic agent has been cyclopropane—it is potent, non-irritating, can be used in high oxygen atmospheres, and is so controllable that it can easily be adjusted to the varying requirements of individual patients. Our record with the use of cyclopropane in old people has been remarkably satisfactory. In situations where we do not want to use an inflammable anaesthetic, the newer agents—halothane (Fluothane) or methoxyflurane (Penthrane) can be used safely and with no deleterious effect on old people provided they are given with caution and overdosage is avoided. There is no contraindication to using curare, succinylcholine, or one of the other muscle relaxants in old people, provided that all the usual facilities for support of respiration are always immediately available.

However, I do want to sound a serious warning about the danger of overdosage of intravenous barbiturate anaesthetics in old people. Pentothal and similar drugs have had a simply revolutionary effect on anaesthesiology because they have made induction so rapid and so pleasant. All the terrors of a suffocating, whirling, star-filled dream world have gone forever. But like all drugs, barbiturates are toxic, and in anaesthesia this very ease of induction sometimes tempts doctors to use them unwisely. Disasters have occurred because the toxicity of barbiturates, particularly in relation to the heart, has been unrecognized. Old people are specially susceptible. There is only one excuse for using intravenous barbiturates in anaesthesia: that is to put patients to sleep, but not to keep them asleep. When a barbiturate is given for this purpose to old people it should be in dilute concentration and minimal dosage. The dose is in proportion to the age and physical condition of the patient. The older and sicker the patient the more I am inclined to avoid barbiturates altogether. An experienced anaesthesiologist can induce sleep with cyclopropane or nitrous oxide quite pleasantly, rapidly, and much more safely.

I haven't said much about the use of conduction anaesthesia in the aged—by this term I mean local anaesthesia by topical application, field block, regional block, or epidural or spinal block. All of these methods can be used when the circumstances in a particular case make such a procedure seem justified, but there is no truth in the widely held belief that local anaesthesia should be used in preference to general anaesthesia whenever possible because it is safer. There is danger with local anaesthesia just as there is with general anaesthesia, as I could show by the recitation of countless incidents; but it is my opinion that well-conducted general anaesthesia, employing the techniques which we have been talking about, is quite as safe as local for old people, and can be infinitely more pleasant and less terrifying. To subject a poor old man or woman with a broken hip to the technical rigours of the administration of epidural or spinal block just because we think it is safer than putting them to sleep is certainly nonsense. On the other hand, quite decrepit old men often do very well with a

small dose spinal anaesthesia for prostatectomy. The choice of method as well as agent should be left to the judgment of an experienced anaesthesiologist.

5. *Nerve Palsies and Other Postural Effects.* In some ways old people are tough and resilient, but sometimes they are extraordinarily susceptible to tissue damage. Proper posture, padding, and support during anaesthesia are most important. Profound muscle relaxation may lead to painful sequelae if there is not adequate support to the lumbar region, the neck, or a limb. Veins, arteries, and nerves in thin old people are easily injured by pressure; and thrombosis, phlebitis, gangrene, pressure sores, or motor paralysis may ensue. Fat old people are subject to impaired circulation and respiration whenever they are turned upside down or laid flat on their faces, or put into other unnatural positions. It is the anaesthesiologist's duty to see that all these dangers are avoided. One cannot be too careful in paying attention to such things. The margin of safety (or we might call it the "allowance for carelessness") is much less in an old person than in a robust young one. The straw which breaks the camel's back may be a very small one when the camel is nearing the end of its journey.

6. *Psychic Trauma and Other Iatrogenic Disease.* The last item on my list of anaesthesiological hazards of the aged is psychic trauma. Old people are not usually so frightened of unseen dangers as are the very young, but facing anaesthesia and surgery is always an adventure, and we should do what we can to make the experience reasonably pleasant. Personal attention and kindness by the anaesthesiologist will inspire confidence, and we can do much by the judicious use of preoperative medication to allay fear and invoke a comforting sense of nonchalance. My teacher, Wesley Bourne, used to say that the purpose of premedication is "to obtund, to obfuscate, and to obnubilate." We now have drugs which can put a patient into this pleasant condition without having to overwhelm him with depressing narcotics, and I think it our duty to use them. But these preoperative drugs should be prescribed on an individual basis for a particular patient. Routine medication is even more dangerous in old people than in others.

It is bad enough to frighten our patients, but unfortunately we sometimes give them other troubles to remind them of our attention. One hears nowadays the term "iatrogenic" disease. This is a dreadful word. I used to think it meant disease produced by human causes, but it is worse than that. It actually means "physician-caused" disease. Think of it! A patient goes to a physician to be cured of some trouble, and comes away with so-called side-effects of the treatment which may be as bad as the original disease. I am ashamed to confess that I have memories of such things happening in my own practice. In anaesthesiology we must necessarily and literally take the life of the patient into our hands. We assault him with drugs, deprive him not only of consciousness but often also of the power to take a breath or move a muscle, and even the force and rhythm of his heart may be under our control. How important it is, therefore, that the anaesthesiologist be alert, well trained, and fortified by observant experience. The state of anaesthesia is produced only by physiological upset of some sort, and it is our duty as anaesthesiologists, whether we are dealing with the young or the old, to choose the least upsetting drugs and methods which may be needed

to bring about the required anaesthesia. We are faced with a choice in which we must employ the least of many evils. I do feel, however, that anaesthesiology has progressed to the point that we can assure our older patients that they won't be any worse as the result of the anaesthetic, and that we are going to do them no harm.

My final comment in regard to anaesthesiology in old age is to plead for a little more intelligent approach to inevitable death than is sometimes shown by some members of the medical profession. Anaesthesiologists are charged with much responsibility to keep patients alive—in France they are even called "réanimateurs"—but that doesn't mean that we should invariably attempt to prolong life by a few hours or days in a patient who is obviously and inevitably dying. We all must come to the end of the road somehow, some day, and it seems to me that when this time comes for one of our patients, it is our God-given responsibility to assist him, and to let him die in comfort and with dignity. I am not advocating legalized euthanasia; I'm just suggesting that we don't pester dying old people with tubes from every body orifice, and don't pour blood and other fluids into veins where it can't possibly do any good. In anaesthesiology, as in all other fields, let us temper our knowledge with wisdom and with mercy.

#### RÉSUMÉ

Parler des problèmes des vieillards m'a semblé jusqu'à aujourd'hui comme parler des problèmes d'un peuple d'un pays étranger. Je réalise tout à coup que je parle de choses qui concernent des gens comme moi. En ce qui concerne l'anesthésiologie, il n'y a pas de problèmes particulièrement associés aux vieillards. Les dangers et les risques associés à l'anesthésie chez les vieillards sont les mêmes dangers et les mêmes risques que chacun rencontre en traitant ceux qui sont encore dans le soi-disant "début de la vie" à quelque moment que ce soit. La seule différence que je peux entrevoir dans la conduite de l'anesthésie chez les vieillards c'est que là, plus que nulle part ailleurs, il est important de respecter les principes d'une bonne anesthésie. Lorsque l'on peut donner réellement une bonne anesthésie, il n'est pas vrai de dire qu'un malade est trop âgé pour être anesthésié. S'il ne reste qu'une étincelle de vie, une bonne anesthésie va la conserver et peut même supporter la vie durant de longues périodes de crise.

Les dangers de l'anesthésie qui constituent chez le vieillard un plus grand risque que chez le jeune individu robuste sont: (1) de l'oxygène en quantité insuffisante; (2) une élimination inadéquate du gaz carbonique; (3) un déséquilibre des liquides et des électrolytes; (4) la toxicité des médicaments; (5) des paralysies nerveuses; (6) le traumatisme psychique et les effets iatrogéniques.

Pour prévenir l'hypoxie, il est absolument nécessaire d'avoir des voies respiratoires libres. La meilleure façon de s'assurer cette condition chez les vieillards c'est d'employer presque de routine l'anesthésie endotrachéale. La liberté des voies respiratoires est tellement importante chez les inconscients, que cette inconscience soit due ou non à l'anesthésie, que j'ai la conviction que tout médecin de pratique générale devrait avoir parmi ses instruments un laryngo-

scope et des tubes endotrachéaux et savoir comment les utiliser. Il n'est pas nécessaire d'avoir un cylindre d'oxygène; il y a peu de vies qui sont sauvées par l'oxygène qui n'auraient pas pu l'être par l'usage à point et efficace de l'air.

Pour éviter l'hypercarbie il faut une respiration active. En conséquence, il est nécessaire que nous assistions ou contrôlions la respiration pour garder le  $\text{CO}_2$  à un taux normal.

Il faut porter une attention spéciale au maintien du volume sanguin et à l'équilibre des électrolytes. La survie de plusieurs vieillards après la chirurgie majeure est due à l'application intelligente de ce que nous savons concernant l'eau, le sucre, le sel, le calcium, le potassium, l'iode, le fer et les hormones et les enzymes qui régularisent ces éléments vitaux dans nos organismes.

La toxicité des médicaments doit être particulièrement surveillée chez les vieillards et la multiplicité des médicaments est également un problème et un danger en anesthésiologie tout comme en thérapeutique. Un agent anesthésique n'est pas nécessairement bon parce qu'il est récent ou mauvais parce qu'il est vieux ou vice versa. Les différents agents anesthésiques n'ont peut-être pas les avantages ou les désavantages transcendants qu'ils avaient. A condition qu'un anesthésiste fasse attention aux autres facteurs dont nous avons parlé, il peut administrer une aussi bonne anesthésie avec n'importe lequel des agents. Néanmoins, chez les vieillards, il n'y a aucun doute que certains agents anesthésiques sont moins nocifs que d'autres. L'éther agit comme un irritant et un dépresseur lorsqu'on l'emploie à plus forte dose qu'une quantité minimale et il n'est pas le meilleur agent à employer chez les vieillards. Lorsqu'il est possible d'employer un gaz, c'est l'agent de choix. Les gaz s'absorbent et s'éliminent rapidement et le contrôle que cela permet est un des plus importants facteurs pour la sécurité en anesthésie. Il n'y a pas de contre-indication à employer les myorésolutifs chez les vieillards, à condition que toutes les facilités habituelles pour maintenir la respiration soient à la portée de l'anesthésiste.

Alors que les barbituriques intraveineux ont obtenu un effet révolutionnaire en anesthésiologie parce qu'ils ont rendu l'induction tellement sûre, rapide et agréable, les vieillards sont spécialement sensibles à leurs effets dépresseurs et il est survenu des désastres parce que leur toxicité n'a pas été reconnue. Plus le malade est âgé et faible plus je serais tenté d'éviter l'usage des barbituriques.

Il n'y a rien de vrai dans cette croyance répandue que l'anesthésie locale plutôt que la générale devrait être utilisée chez les vieillards parce qu'elle est plus sûre. Pour les vieillards, une anesthésie générale bien faite est aussi sûre qu'une anesthésie locale et elle peut être beaucoup plus plaisante et moins terrifiante. Le choix de la méthode aussi bien que celui de l'agent devrait être laissé au bon jugement d'un anesthésiologiste expérimenté.

Les vieillards sont extraordinairement sensibles aux dommages tissulaires. Un relâchement musculaire marqué peut produire des séquelles douloureuses si l'on n'a pas soin de supporter la région lombaire, le cou ou les membres. Les veines, les artères et les nerfs chez les vieillards amaigris sont faciles à blesser par pression. Il est très important de coussiner adéquatement, de placer et de supporter ces vieillards durant l'anesthésie. La paille qui brise le dos du chameau peut être bien petite lorsque le chameau est prêt d'atteindre la fin de son voyage.

Les vieillards ne sont pas aussi anxieux que les plus jeunes devant des dangers cachés, mais c'est toujours une aventure de faire face à une anesthésie et à une opération et nous devons nous efforcer de rendre cette expérience aussi plaisante que possible par une bonté et une attention toute personnelle et l'emploi judicieux d'une médication préopératoire. Il faut prescrire les médicaments préopératoires sur une base individuelle; la médication de routine est plus dangereuse chez les vieillards que chez les autres.

Nous devons être sur nos gardes pour éviter les problèmes iatrogéniques. En anesthésiologie, nous tenons littéralement la vie du malade dans nos mains. Nous assaillons le malade avec nos médicaments, nous le privons non seulement de la conscience mais souvent aussi du pouvoir de prendre une respiration ou de bouger un muscle; même la force et le rythme de son cœur peuvent être sous notre contrôle. En conséquence, il est important que l'anesthésiste soit vigilant, bien entraîné et appuyé par l'expérience clinique.

Enfin, en ce qui concerne l'anesthésiologie chez les vieillards, je serais en faveur d'envisager la mort inévitable d'une façon plus intelligente que ne le manifestent quelquefois certains membres de la profession médicale. Un jour, tous, il nous faut arriver au bout du chemin et il me semble que lorsque ce moment est arrivé pour un de nos malades, il est de notre responsabilité de l'assister et de le laisser mourir dans le confort et la dignité et non pas d'empoisonner les vieux moribonds avec des tubes dans tous les orifices du corps et de leur servir du sang et des fluides dans les veines alors qu'il est impossible que cela fasse du bien. En anesthésiologie, utilisons nos connaissances avec sagesse et avec pitié.