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Intubation Difficulty Scale

Anticipated Best Use

REALISTICALLY characterizing the difficulty of tracheal intubation is an important responsibility of care-givers. The Intubation Difficulty Scale (IDS), introduced in this issue of ANESTHESIOLOGY by Adnet *et al.*[1], is a numerical score of total intubation difficulty and is based on seven parameters known to be associated with difficult intubation.[1] The scoring of each individual parameter represents a divergence from an "ideal" condition (*i.e.*, the parameter has no difficulty), and the total score represents the sum divergence from a zero difficult "ideal" intubation. The seven parameters are number of supplementary attempts, number of supplementary operators, number and type (in chronologic order) of alternative techniques used, laryngoscopic grade, subjective lifting force, the use of external laryngeal manipulation, and mobility or position of the vocal cords.

The IDS is a quantitative measure of the total intubation difficulty encountered during a chosen procedure or sequence of procedures and is calculated after the fact. Therefore, the IDS for a given patient depends on the appropriateness of the choice of procedure or sequence of procedures, and it is not a means of predicting difficulty for an individual intubation. It is anticipated that there will be two very good and broad uses of the IDS.

First, the IDS communicates the total intubation difficulty for a given patient to the next care-giver, and the score alone may greatly influence the choice of future care. However, the IDS alone does not shed any light on the cause of an increased IDS. For this reason, it will be very important to communicate the scores of the individual elements of the IDS in every case so that subsequent care-givers can identify the problem element(s) and the final solution to the problem element(s). For example, if three direct rigid laryngoscopy attempts by two operators were followed by a final successful flexible fiberoptic endoscopy-aided technique (see definition of "N3" in reference 1), then this information could and should direct future clinical care.

Second, for populations of patients who are the same in every respect, save one variable, the IDS may then reflect the importance of the variable. For example, in identical patients, the variable could be intubation technique A *versus* intubation technique B. In identical patients who are treated identically, the IDS could test and reflect the predictive power of a single preoperative test such as high or low oropharyngeal classification or long or short mandibular space. For a final example of using homogenous groups, a consistently different IDS for different practitioners (*i.e.*, anesthesia residents) may be a measure of skill or judgment. It is possible that the IDS could be revealing of important information in nonhomogeneous populations of patients if the number of patients was sufficiently large to permit multivariate analysis of factors.

In summary, the new IDS appears be the best indica-

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tor of total intubation difficulty available to date. As such, it is anticipated that best uses will be to influence patient care and as a research tool to discern significant differences in clinical variables and care. It is very probable that the innovative IDS will inspire further research that is concerned with developing the best IDS and the best use of the IDS.

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Drug Distribution

Less Passive, More Active?

DRUG effects are largely determined by the concentration of drug at the site of action. During the past few years we have come to recognize that there is considerable variation among individuals in their response to similar doses of drug. Some of that interindividual variability is a result of differences in drug sensitivity (pharmacodynamic variability), but a large amount of interindividual variability seen in drug response is a result of variability in drug concentration at the receptor site (pharmacokinetic variability).

In most therapeutic situations and in some anesthetic settings, drugs are administered in multiple doses, most often by the oral route. With such chronic dosing, the important determinant of mean plasma (and hence receptor site) concentration is the drug's clearance, or elimination, from the body. Hence we see the familiar relationship of Cp_{ss} = rate of administration/clearance (where Cp_{ss} is the mean steady state concentration). Thus at steady state, mean plasma drug concentration depends only on the dose (rate of administration) and the drug's clearance. As dose is defined, interindividual variability in steady state plasma drug concentration depends solely on drug clearance. The recognition of the importance of drug clearance as a determinant of plasma drug concentration has led to considerable effort being devoted to defining the factors responsible for interindividual variability in drug clearance. For most lipid-soluble drugs, the principal route by which a drug is eliminated from the body is *via* metabolism by the cytochrome P450 system in the liver. For water-soluble drugs such as digoxin, elimination occurs principally through glomerular filtration. The effects of drug interactions, disease states, and pharmacogenetic factors, and so on on these processes of elimination have been well defined. Inhalational anesthetics themselves inhibit drug metabolism and result in higher drug concentrations, *e.g.*, during halothane anesthesia.[1]

However, anesthesiologists frequently do not administer drugs for long enough to reach steady state. On the contrary, they often administer single doses of drugs to produce rapid effects (*e.g.*, induction agents) that dissipate quickly. The principal determinant of drug effect after such a single (usually intravenous) dose is not drug elimination but drug distribution, and drug effect is terminated when drug concentration at the

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