Anesthesiology
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A Patient's Description of His Spinal Anesthetic: The Need for Reassurance

To the Editor:—Last month, at age 60, I had a lower torso spinal block for an operation. Everything was successful. When I started to "come to" in the recovery room, the nurses said, "Wiggle your toes"—and I couldn't, my legs were totally dead. My immediate thought was, "Something went wrong with the spinal, and I am paralyzed." As I faded in and out, this was my recurrent thought, and I was too sedated to verbalize this concern. Thus, for whatever time it took (an hour—an hour and a half?) I was subjected to a level of mental anguish that no one should have to suffer unnecessarily. I say "unnecessarily" because it can be avoided or at least greatly minimized with two easy and simple changes in words and phrases.

When I told the anesthesiologist the next day, he said, "But I told you there would be some numbness." I submit that this is not sufficient.

I suggest that the anesthesiologist say the obvious, such as, "The spinal block is to deaden the pain by blocking the nerves, and therefore also muscular response—and the general sedative will wear off before the spinal block, and you will not be able to move for a few minutes. The recovery room nurses will check the wearing off of the spinal block by your ability to wiggle your toes." Thus, everything is descriptive and sequential. The OR recovery room nurses should say, "Can you wiggle your toes yet? If not, then the spinal block has not worn off yet. Don't worry everything is fine, go back to sleep."

Webster's (1966) second definition of anesthetic (yes, now everyone knows that I had to look up the spelling) is, "lacking perceptive sensitivity"—how apt in my example. I hope that all of you will take to heart these simple suggestions because it really was a terrifying experience and totally unnecessary.

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Computer-assisted Pediatric Worksheets for Anesthesia

To the Editor:—Anesthesia for infants and children requires a clear understanding of the differences between pediatric and adult patients. These differences encompass not only the size differential of each of the organ systems involved (renal, cardiovascular, pulmonary) but pharmacologic, anatomic, and physiologic responses as well. Imprecise dosages of drugs, improper fluid administration, or poorly chosen anesthetic equipment can turn a routine pediatric case into a disaster.

No formula can accurately predict the drug requirements of infants in early life, however, some guidelines are necessary. Several authors have advocated the calculation of fluid needs, drug dosages, and respiratory variables of pediatric patients prior to the induction of anesthesia.[1,2] Pediatric worksheets have become popular as an aid to anesthesia residents at our institution preparing for pediatric cases. Worksheets initially were written by residents and listed the formulas for the calculation of drug dosages, fluid deficits, and infusions. Formulas varied from resident to resident and often were incorrect. Numerous calculations were needed and were as error prone as those performed mentally.

We have developed a pediatric worksheet for use in cardiac as well as general anesthesia, based upon one of the personal computer "spreadsheet programs." A spreadsheet is a program that allows the user to put information into a multicolumn worksheet matrix and perform simple calculations on the information. The programs originally were developed for financial modeling but are flexible enough to be adapted by the nonprogrammer for a wide variety of uses.[3]

Using a minimum of equipment, an accurate and neatly presented worksheet can be prepared quickly for an individual patient. The example shown was developed using Visicalc (Visicorp; San Jose, California), an electronic spreadsheet program, on an Atari 400 Computer (Atari, Inc.; Sunnyvale, California) with 48K bytes of memory, a single floppy disk drive, and printer. The formula used for deriving values for a fluid management and drug dosages were taken from current editions of widely used anesthesia texts.[4–6] The Pediatric Worksheet template was prepared as illustrated in figure 1*A* and saved so that either a blank form or a completed form for an individual patient could be printed out. A completed form required

A

Patient
Number:
Name: WEIGHT: kg
Birth: AGE: YR

TUBE: TUBE LENGTH:

FLUIDS:

MAINTENANCE:	4cc/kg x 1st 10kg =		cc/hr
	2cc/kg x 2nd 10kg =		cc/hr
	1cc/kg x rem. kg =		cc/hr
	TOTAL FLUID =		cc/hr
DEFICIT:	cc/hr x	hrs NPO=	cc
1st HOUR:	maint +	(.5def) =	cc +loss
2nd HOUR:	maint +	(.25def)=	cc +loss
3rd HOUR:	maint +	(.25def)=	cc +loss
4th HOUR:	maint +	=	cc +loss
URINE OUTPUT:	1cc/kg/hr x	kg =	cc/hr
BLOOD VOLUME:	0-2 yr>80cc/kg x	kg =	cc infnt
	2-16 yr>70cc/kg x	kg =	cc child
	man >60cc/kg x	kg =	cc man
	woman >55cc/kg x	kg =	cc woman

PATIENT BLOOD VOLUME = cc

% x	cc	=	cc
30 % x	cc	=	cc

REPLACE BLOOD LOSS: cc x 3 = cc

DRUGS:

Induction

PENTOTHAL	3mg/kg	=	mg =	cc
FENTANYL	10mcg/kg	=	mcg =	cc
	25mcg/kg	=	mcg =	cc
	50mcg/kg	=	mcg =	cc
KETAMINE IM	10mg/kg	=	mg =	cc
IV	2mg/kg	=	mg =	cc
PANCURON	.1mg/kg	=	mg =	cc
METOCURIN	.4mg/kg	=	mg =	cc
CURARE	.7mg/kg	=	mg =	cc

Resuscitation

ATROPINE	.01mg/kg	=	mg =	cc
EPHEDRINE	.1mg/kg	=	mg =	cc
	.5mg/kg	=	mg =	cc
CA CL	20mg/kg	=	mg =	cc
EPI 1:10000	.1cc/kg	=		cc
LIDOCAINE 1%	1mg/kg	=	mg =	cc
BICARB	1mEq/kg	=	mEq =	cc
PROPNOLOL	.05mg/kg	=	mg =	cc
VERAPAMIL	100mcg/kg	=	mcg =	cc

DRIPS:

NTG	200mcg/ml = 50mg/250ml	
	.25mcg/kg/min =	cc/hr
	1mcg/kg/min =	cc/hr
NTP	200mcg/ml = 50mg/250ml	
	.1mcg/kg/min =	cc/hr
	8mcg/kg/min =	cc/hr
NEOSYN	100mcg/ml = 10mg/100ml	
	.2mcg/kg/min =	cc/hr
ISUPREL	4mcg/ml = .4mg/100ml	
	.01mcg/kg/min =	cc/hr
DOPAMINE	800mcg/ml = 400mg/500ml	
	2mcg/kg/min =	cc/hr
	16mcg/kg/min =	cc/hr
DOBUTAMIN	1mg/ml = 250mg/250ml	
	2mcg/kg/min =	cc/hr
	16mcg/kg/min =	cc/hr
EPINEPHRN	8mcg/ml = 2mg/250ml	
	.01mcg/kg/min =	cc/hr
	.2mcg/kg/min =	cc/hr
LEVOPHED	8mcg/ml = 2mg/250ml	
	.01mcg/kg/min =	cc/hr
	.2mcg/kg/min =	cc/hr
LIDOCAINE	2mg/ml = 500mg/250ml	
	15mcg/kg/min =	cc/hr
	50mcg/kg/min =	cc/hr
POTASSIUM		
	.25mEq/kg/hr =	cc/hr

B

Patient
Number: 9999999
Name: BABY JAMES WEIGHT: 5 kg
Birth: 1 1 83 AGE: 1 YR

TUBE: 4.0 TUBE LENGTH: 13

FLUIDS:

MAINTENANCE:	4cc/kg x 1st 10kg =		20 cc/hr
	2cc/kg x 2nd 10kg =		0 cc/hr
	1cc/kg x rem. kg =		0 cc/hr
	TOTAL FLUID =		20 cc/hr
DEFICIT:	20 cc/hr x	4 hrs NPO=	80 cc
1st HOUR:	20 maint +	40(.5def) =	60 cc +loss
2nd HOUR:	20 maint +	20(.25def)=	40 cc +loss
3rd HOUR:	20 maint +	20(.25def)=	40 cc +loss
4th HOUR:	20 maint +	=	20 cc +loss
URINE OUTPUT:	1cc/kg/hr x	5 kg =	5 cc/hr
BLOOD VOLUME:	0-2 yr >80cc/kg x	5 kg =	400 cc infnt
	2-16 yr>70cc/kg x	5 kg =	350 cc child
	man >60cc/kg x	5 kg =	300 cc man
	woman >55cc/kg x	5 kg =	275 cc woman

PATIENT BLOOD VOLUME = 400 cc

35 % x	400 cc	=	140 cc
30 % x	400 cc	=	120 cc

REPLACE BLOOD LOSS: 20 cc x 3 = 60 cc

DRUGS:

Induction

PENTOTHAL	3mg/kg	=	15.00 mg =	0.60 cc
FENTANYL	10mcg/kg	=	50.00 mcg =	1.00 cc
	25mcg/kg	=	125.00 mcg =	2.50 cc
	50mcg/kg	=	250.00 mcg =	5.00 cc
KETAMINE IM	10mg/kg	=	50.00 mg =	0.50 cc
IV	2mg/kg	=	10.00 mg =	1.00 cc
PANCURON	.1mg/kg	=	0.50 mg =	0.50 cc
METOCURIN	.4mg/kg	=	2.00 mg =	1.00 cc
CURARE	.7mg/kg	=	3.50 mg =	1.17 cc

Resuscitation

ATROPINE	.01mg/kg	=	0.05 mg =	0.13 cc
EPHEDRINE	.1mg/kg	=	0.50 mg =	0.10 cc
	.5mg/kg	=	2.50 mg =	0.50 cc
CA CL	20mg/kg	=	100.00 mg =	1.00 cc
EPI 1:10000	.1cc/kg	=		0.50 cc
LIDOCAINE 1%	1mg/kg	=	5.00 mg =	0.50 cc
BICARB	1mEq/kg	=	5.00 mEq =	5.62 cc
PROPNOLOL	.05mg/kg	=	0.25 mg =	0.25 cc
VERAPAMIL	100mcg/kg	=	500.00 mcg =	0.05 cc

DRIPS:

NTG	200mcg/ml = 50mg/250ml	
	.25mcg/kg/min =	0.38 cc/hr
	1mcg/kg/min =	1.50 cc/hr
NTP	200mcg/ml = 50mg/250ml	
	.1mcg/kg/min =	0.15 cc/hr
	8mcg/kg/min =	12.00 cc/hr
NEOSYN	100mcg/ml = 10mg/100ml	
	.2mcg/kg/min =	0.60 cc/hr
ISUPREL	4mcg/ml = .4mg/100ml	
	.01mcg/kg/min =	0.75 cc/hr
DOPAMINE	800mcg/ml = 400mg/500ml	
	2mcg/kg/min =	0.75 cc/hr
	16mcg/kg/min =	6.00 cc/hr
DOBUTAMIN	1mg/ml = 250mg/250ml	
	2mcg/kg/min =	0.60 cc/hr
	16mcg/kg/min =	4.80 cc/hr
EPINEPHRN	8mcg/ml = 2mg/250ml	
	.01mcg/kg/min =	0.38 cc/hr
	.2mcg/kg/min =	7.50 cc/hr
LEVOPHED	8mcg/ml = 2mg/250ml	
	.01mcg/kg/min =	0.38 cc/hr
	.2mcg/kg/min =	7.50 cc/hr
LIDOCAINE	2mg/ml = 500mg/250ml	
	15mcg/kg/min =	2.25 cc/hr
	50mcg/kg/min =	7.50 cc/hr
POTASSIUM	.1mEq/ml = 10mEq/100ml	
	.25mEq/kg/hr =	12.50 cc/hr

FIG. 1*A*. Template of pediatric worksheet illustrating the electronic spreadsheet format and the formulae used. *B*. Completed pediatric worksheet showing fluid maintenance, blood volume, drug dosages, and intravenous infusions.

entering the patient's name, age, weight, hematocrit, and hours NPO as variable values.

With the calculating priority set by rows, the program sequentially generates the completed form (fig. 1*B*). A single page is sufficient for fluid management, estimated blood volumes and appropriate doses of commonly used induction, maintenance, and resuscitation agents. A second page lists dosages, dilution factors and infusion rates for vasopressors, inotropes, and antiarrythmics. Our format was planned for cardiac anesthesia, but it could be adapted easily for all types of anesthesia.

The initial template required approximately 30 min to set up. Production of a pediatric worksheet requires loading the program and file from a floppy disk and entering variables. The finished form requires less than 2 min including printing time.

Many anesthesia departments already have a personal computer available for use in case management, word processing, and billing. Although the computer we used is typical of inexpensive and commonly available systems, spreadsheet programs are available for almost any computer.[3] The authors will be glad to provide greater details for those interested in developing their own spreadsheet formats for use in anesthesia practice.

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REFERENCES

1. Lebowitz DW, Newberg LA, Gillette MT: Clinical Anesthesia Procedures of the Massachusetts General Hospital, Second Edition. Boston, Little Brown, and Company, 1982
2. Smith RM: Anesthesia for Infants and Children. St. Louis, CV Mosby, 1980, pp 547-583, 666-671
3. Heintz C: Seeking solutions with spreadsheets. Interface Age 8:52-59, 1983
4. Biller JA, Yeager AM: The Harriet Lane Handbook, Ninth Edition. Chicago, Yearbook Medical Publishers, 1981
5. Gregory GA: Pediatric anesthesia, Anesthesia. Edited by Miller RD. New York, Churchill Livingstone, 1981, pp 1197-1226
6. Dripps RD, Eckenhoff JE, Vandam LD: Introduction to anesthesia, The Principles of Safe Anesthesia. Philadelphia, WB Saunders, 1982, pp 303-320

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Tracheal Tube Guide to Facilitate Nasotracheal Intubation

To the Editor:—The Magill forceps commonly are used to guide the endotracheal tube into the larynx during nasotracheal intubation. Other devices such as the Bearman[1] wire hook or the tracheal tube retractor[3] may be required in patients who have severe anatomic deformities of the pharynx, jaw, and cervical spine. The use of these devices have been described by Munson,[2] Chester,[3] and Singh.[4]

Difficult nasotracheal intubations are encountered in patients with micrognathia,[4] ankylosis, or fractures of the mandible and ankylosing spondylitis.[2] Hematomas and abscess formation of the pharynx, palate, and tongue also may cause intubation problems.

The tracheal tube guide is designed to facilitate nasotracheal intubation (fig. 1) in patients who present with problems described above.

In operation, the nasotracheal tube is passed until the end may be visualized or palpated in the pharynx. The guide may engage the tube above the cuff under direct laryngoscopy or blindly with the palpating finger. When the blades of the guide engage the tube, the end may be directed in any direction required (fig. 2).

When the tip of the tube enters the larynx, the tracheal tube guide may be disengaged by rotating the angulated handle to the midline.

The tracheal tube guide design has certain advantages over the Magill forceps and the Bearman hook:

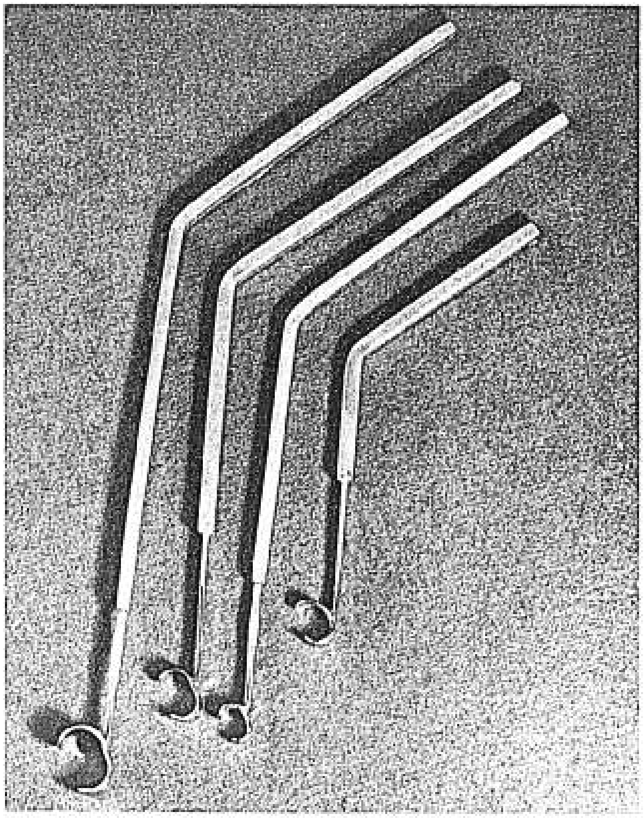

FIG. 1. The four sizes of the tracheal tube guides available.