

**TITLE:** A SIMPLE, RELIABLE, INEXPENSIVE METHOD TO AID  
IN THE DETECTION OF DIVERSION OF CONTROLLED  
SUBSTANCES BY OPERATING ROOM PERSONNEL

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**Introduction:** Anesthesiologists are at increased risk to develop the disease of chemical dependency. The disease is often accompanied by diversion for personal use of the drugs utilized for anesthesia. A common method of diversion is to remove some of the drug from the syringe and then refill the syringe with i.v. fluid. Current analytical methods are too expensive and time consuming for screening purposes. We used a refractometer (total solute meter) to see if we could accurately and reliably detect dilution of controlled substances with i.v. fluids.

**Methods:** A Reichert-Jung refractometer (Cambridge Instruments model 10441) was used in the present work. The four controlled substances most commonly used in our operating room were evaluated (alfentanil, sufentanil, fentanyl, and midazolam). The refractive index of five samples of each drug was measured at full, 3/4, 1/2, and 1/4 strengths. The diluents used were lactated ringers [LR], 5% dextrose in lactated ringers [DSLR], 0.9% sodium chloride [NS], and 5% dextrose in water [DSW]. Each sample was read by two different pharmacists.

**Results:** The refractometer readings for the i.v. solutions were LR and NS = 1.0, DSLR = 5.5, and DSW = 4.5. Table 1 shows the results, in Brix units, of diluting the drugs to half their original concentration with the commonly used i.v. solutions.

	UNDILUTED	LR	DSLR	DSW	NS
ALFENTANIL	1.25	1.05	3.50	2.75	1.05
SUFENTANIL	0	0.50	2.75	2.25	0.50
FENTANYL	0	0.50	2.75	2.25	0.50
MIDAZOLAM	2.50	1.75	4.00	3.50	2.00

The other dilutions of the drugs gave similar results, i.e., it was obvious as to whether the drug was in its concentrated form or not.

**Discussion:** Commercial qualitative determinations of fentanyl type drugs cost in the area of \$40/determination. Quantitative determinations are even more costly. We randomly test the syringes returned daily and specifically check the returned syringes when there is a suspected case of diversion of controlled substances. At \$40 or more per determination the cost of such a program would be prohibitive. This simple, inexpensive, reliable screening method allows for early detection of and continued monitoring for diversion of controlled substances used in the operating room.

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**TITLE:** DIFFICULT INTUBATION: INCIDENCE AND  
PREDICTABILITY. A PROSPECTIVE STUDY OF  
8284 ADULT PATIENTS

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Unexpected difficulties with tracheal intubation are leading among the causes of anesthetic morbidity and mortality<sup>1</sup>, for example tooth damage, sore throat, or even brain damage and death. In a prospective study we investigated the incidence of difficult intubation (DI). Several well known signs of an impending DI, simple bedside measurements and the recently described visibility of pharyngeal structures<sup>2</sup>, applied in a modified way, were tested for their prognostic value in indicating a DI.

During a one year period all preoperative patients of our hospital were examined - with the approval by the local research committee - for the following signs: Anamnestic data (ANA); limited mobility of the cervical spine (CS); anatomic abnormalities of face, neck, and teeth (FNT) as judged by the individual anesthesiologist; visibility of the pharyngeal structures examined on the upright sitting patient phonating "Aaa" while opening the mouth widely and putting out the tongue (PHY 1 - 3, modified<sup>2</sup>); opening of the mouth (MO) and distance between chin and thyroid notch (CTD) in the extended head position in cm. The performance of tracheal intubation was documented (I NP - no problems at the first attempt;

I CP - intubation at the first attempt with pressure on the thyroid). In case of DI (I N - not intubated at the first attempt) this was verified by a consultant. The feasibility of the second attempt was documented as II NP (no problems) or II D (proven difficulties). The distribution of the indications for DI to the difficulty classes was tested for statistical significance ( $p < 0.01$ ) of differences by the  $\chi^2$ -test. Specificity and sensitivity were calculated.

101 (II D) out of 254 cases (I N) turned out to be difficult even for a consultant. The table gives the indications of DI vs. difficulty:

	n	PHY1	PHY2	PHY3	ANA	CS	FNT	MO<4	CTD<6
I NP	6846	5726	1069	51	10	72	91	136	59
I CP	1184	827	337	20	18	27	49	57	23
I N	254	181	66	7	4	5	29	14	5
II NP	153	121	30	2	3	2	15	6	2
II D	101	60	36	5	1	3	14	8	3

PHY1 vs PHY2/3, FNT, and MO<4, all statistically significant.

We conclude from these data that, although DI is not absolute and its incidence may be reduced by a consultant from 3.1 to 1.2%, in either case it is not a rare event. We have to be aware of this problem and must look for signs predicting possible DI. None of the indications tested in this study revealed failproof, but FNT, MO<4 and PHY>1 should alert to a greater probability of a DI and thereby reduce the incidence of an unexpected DI.

References: 1. Int Anesthesiol Clin 22: 43-59, 1984  
2. Can Anaesth Soc J 32: 429-434, 1985