The endotracheal administration of diazepam has been widely taught in para-
medic training programs as well as Advanced Cardiac Life Support (ACLS)
classes. In fact the mnemonic N.A.V.E.L.  
(naloxone, atropine, Valium, epinephrine, lidocaine) was developed to help prehos-
pital personnel recall the medications which can be administered endotracheally. How-
ever, there is very little evidence in medi-
cal literature supporting the use of en-
dotracheal diazepam and it may be harm-
ful to the pulmonary tissues.

One of the first researchers to investi-
gate endotracheal administration of dia-
zepam was Dr. William G. Barsan and
colleagues at the University of Cincin-
натi. In this study a 0.5 mg/kg solution of
diazepam was diluted with enough 95
percent ethyl alcohol to obtain five mil-
liters of solution. The solution was admin-
istered to five mongrel dogs who
were previously anesthetized. Blood lev-
els of diazepam were periodically ob-
tained and found to be comparable to
those following intravenous administra-
tion of diazepam. Although there were no
short term pulmonary complications, the
long term effects of endotracheal diazep-
am were not studied as the dogs were
sacrificed following the experiment.

In 1985 Drs. Pasternak and Heller at the
Center for Emergency Medicine in Pitts-
burg published the only report where
endotracheal diazepam was administered
to an adult. The patient, a 76 year old
female, was administered five milligrams of
Valium endotracheally by paramedics
which terminated her seizure activity. No
pulmonary complications were reported.

In the only other published report a
seven month old infant was administered
one milligram of diazepam and no long
term complications were reported. Many
authors have subsequently written about
endotracheal drug administration, but have
primarily reviewed the literature and not
described the actual use of endotracheal
diazepam in humans.

In another study Dr. Rusli and his col-
leagues studied the effects of endotrach-
eal diazepam on 11 anesthetized cats. Six
of the cats received endotracheal dia-
zepam and five of the cats received end-
otracheal normal saline. At autopsy,
there was a significant increase in pneu-
monitis (an inflammation of the lung) in
the cats who received diazepam com-
pared to cats who received saline. Unlike
Dr. Barsan’s study, which used diazepam
diluted with 95 percent ethyl alcohol,
Rusli used commercial parenteral diaze-
pam (Valium Hoffman-La Roche).

There are many problems with adminis-
tering Valium endotracheally. The first
is that commercial parenteral prepara-
tions of diazepam contain many ingredi-
ents other than diazepam. Each one mil-
liter of parenteral diazepam (Valium)
contains 40 percent propylene glycol, 10
percent ethyl alcohol, five percent sodi-
um benzoate and benzoic acid, and 1.5
percent benzyl alcohol.

A second potential problem with the
endotracheal administration of parenteral
diazepam is the pH. The pH of the com-
mercial diazepam (Valium) solution ranges
from 6.2 to 6.9. This is more acidic than
the normal pH of the pulmonary tissues
(7.35-7.45). The short and long term ef-
effects of placing one to two milliliters of a
relatively acidic solution into the lungs is
not known but pulmonary inflammation,
shunting, and infection are all possible
complications.

The biggest problem related to the
prehospital administration of diazepam is
the fact that it must be diluted before ad-
mnistration. It has been established that
at least five to 10 milliliters of drug solu-
tion are necessary for successful endotrach-
eal drug administration for adult pa-
tients (one milliliter for infants). Diazep-
am is usually supplied in vials or pre-
filled syringes which contain ten milli-
grams of the drug in two milliliters of
solvent. In order to make a five or ten
milliliter solution the drug must be di-
luted with a suitable solvent. Although
highly soluble in alcohol, diazepam is vir-
tually insoluble in water and most EMS
units do not carry alcohol for diluting
drugs thus making the endotracheal ad-
mnistration of diazepam impossible.

Perhaps additional research will be forth-
coming which will establish the safety
and effectiveness of endotracheal diaze-
pam. Until then, EMS personnel should
consider it the last alternative for treating
status epilepticus in the prehospital set-
ting. The intravenous or rectal routes are
preferred.

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