

Technique

Neuroleptanalgesia in upper alimentary endoscopy

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SUMMARY Droperidol and fentanyl have been used with diazepam in 250 peroral endoscopies because of dissatisfaction with standard methods of sedation. Excellent analgesia has been achieved and complications have been negligible. The technique does not require the presence of an anaesthetist.

Fibreoptic endoscopy of the upper alimentary tract is usually carried out under sedation with intravenous diazepam. This drug has two advantages for the endoscopist: first, the doses normally employed do not approach those required to produce serious respiratory depression, so the presence of an anaesthetist is not regarded as essential; second, the patient can if necessary walk to and from the examination couch and be escorted home after a short recovery period. The sedative effect of intravenous diazepam when used for endoscopy is, however, extremely unpredictable. A few patients appear relaxed and undisturbed by the procedure but many are manifestly uncomfortable or in pain. Restlessness may be such as to require restraint and coughing may be uncontrollable. This does not conform with modern standards of patient comfort and it is no justification that the amnesic effect of diazepam makes most patients forget their unpleasant experience. Additionally, a restless patient may damage expensive equipment which, in financial terms, is becoming increasingly difficult to replace. The analgesic drug pethidine is also sometimes used during endoscopy, either alone or in combination with diazepam, but the results are not appreciably better than when diazepam is used alone. This assessment of current methods of sedation for upper alimentary endoscopy is based partly on personal use of diazepam for 335 cases during the years 1972 to 1974, and partly on experience gained while visiting endoscopy clinics in other hospitals both in Great Britain and on the continent of Europe.

The neuroleptic drug combination of droperidol and fentanyl appeared to offer the possibility of better sedation than that obtained with diazepam or

pethidine. Droperidol (Droleptan) is a major tranquilliser and produces the neuroleptic state of dissociation from the surroundings, in which apprehension is abolished yet normal faculties are retained. It acts rapidly and its peak effect lasts half to two hours. It is also an alpha-adrenergic blocker and a suppressor of the vomiting centre. Fentanyl (Sublimaze) is a narcotic analgesic which in excessive doses will produce respiratory depression. Its action is of rapid onset and analgesia lasts 20 to 30 minutes. Droperidol and fentanyl were found to give good analgesia for endoscopy but consciousness is retained. The effect of these drugs is therefore less easily appreciated by the administrator than that of a drug producing progressive loss of consciousness. Moreover, most patients and most endoscopists would probably regard full awareness, even in a dissociated state, as undesirable.

With the object of evolving a technique suitable for use by an endoscopist working without an anaesthetist, it was decided to employ a basal dose of droperidol and fentanyl, not alone sufficient to give full analgesia and well within the tolerance of the patient, followed by slow administration of sufficient diazepam to produce drowsiness. A trial was planned to determine with what regularity this method would give satisfactory results and whether it could be used with safety without an anaesthetist in the endoscopy room.

Methods

The trial ran for approximately one year from October 1974 to September 1975 and 250 patients were included. As far as possible these were consecutive cases coming for endoscopy, including urgent examinations. Cases were eliminated only

for such reasons as mistakes in the premedication or insufficient help in the endoscopy room for accurate recordings. The same analgesia has been used for ERCP in a number of cases but these were not included.

Apart from premedication the drugs were in all cases administered by the endoscopist himself, the only other medically qualified persons present being endoscopy trainees or observers. Patients not already hospital inpatients were admitted as day cases. The examinations were carried out on a trolley, the foot of which could be raised mechanically and which was equipped with an oxygen cylinder. The same trolley was used to transport patients to and from the ward. The observations on blood pressure and respiration were made by a technician.

PREMEDICATION

This was given by intramuscular injection 30 minutes before the examination. Patients under 65 years of age received droperidol 5 mg and fentanyl 0.1 mg. Patients of 65 or over received droperidol 2.5 mg and fentanyl 0.05 mg. (Droperidol 5 mg and fentanyl 0.1 mg are available in 2 ml ampoules as Thalamonal).

DRUGS IN ENDOSCOPY ROOM

Irrespective of the patient's age, droperidol 10 mg and fentanyl 0.1 mg were given intravenously to nearly all patients. A few frail or very ill patients were given droperidol 5 mg and fentanyl 0.05 mg. The arm veins are usually well dilated after the Thalamonal premedication. A vein on the outer part of the right forearm about 7.5 cm (3 in.) below the elbow was entered with a 23 gauge needle which was strapped in position. Droperidol and fentanyl were injected, after which the pharynx was sprayed with 4% lignocaine. Diazepam was then given slowly (1 mg per minute) until the patient became mildly drowsy. During the diazepam administration the patient was requested to turn on the left side. In a few cases further small quantities of diazepam were given during the examination.

INTUBATION

Under analgesia by this method the patient will swallow on request but the pharyngeal movements are often weak. End-viewing instruments have, therefore, been passed through the pharynx under vision: using the controls of the instrument the tip is angled strongly downwards to negotiate the back of the tongue after which the eye is applied and the larynx visualised. The tip of the instrument is then passed well down into one or other pyriform fossa after which it is rotated back to the mid-line and

gently pushed through the cricopharyngeal sphincter. Side-viewing instruments have been passed without difficulty aided by the patient's movements of deglutition. In all dentulous patients the mouth piece has been placed between the incisor teeth *before* the instrument was passed, ensuring maximum protection of the equipment and obviating the need for the endoscopist's fingers to enter the mouth.

RECOVERY

Day cases have been ready to leave the hospital escorted two to four hours after the examination.

Results

AGE OF PATIENTS

One hundred and fifty patients were under 65 years; 100 were 65 or over.

DRUGS GIVEN IN ENDOSCOPY ROOM

Two hundred and sixteen patients received droperidol 10 mg and fentanyl 0.1 mg intravenously; 34 patients were given half these quantities. Intravenous diazepam was used as follows: 116 patients received 0-5 mg, 126 received 6-10 mg, and eight received 11-15 mg.

INSTRUMENTS

An end-viewing instrument was used in 179 examinations, a side-viewing instrument in 49, and more than one instrument in 21. The examination was abandoned in one case because the patient insisted he could not breathe each time intubation was attempted.

ENDOSCOPIST'S ASSESSMENT

Analgesia was classified as:

Very good Minimal or absent reaction from patient on intubation; no evidence of discomfort during examination—209 cases.

Good Evidence of slight discomfort on intubation and/or briefly during examination—38 cases.

Poor Discomfort other than slight at any stage, or persistent discomfort—three cases.

Salivation was classified according to the amount of saliva that required wiping from the patient's mouth, or from the pillow. This was nil in 188 cases, slight in 60, and profuse in two.

PATIENTS' ASSESSMENT

On full recovery the patients were questioned as to their recall of events during the examination and the amount of discomfort felt. Recall was absent in 83 cases, vague in 117, and clear in 50. Discomfort was absent in 204 cases, slight in 35, moderate in nine, and severe in two.

BLOOD PRESSURE AND RESPIRATION

The respiratory rate was counted and the blood pressure measured by sphygmomanometer: (1) before premedication, (2) before intravenous drugs were given, (3) before instrumentation, (4) five minutes after instrumentation, (5) immediately after withdrawal of the instrument.

The maximum fall in respiratory rate was 0-2 per minute in 145 cases, 3-4 per minute in 64, 5-6 per minute in 30, 7-8 per minute in six, and 9-10 per minute in five. If respirations appeared unduly slow or shallow the patient was requested to breathe deeply and a satisfactory response was always obtained. In a few cases with mild cyanosis oxygen was given through a face mask for a short period before intubation.

The maximum fall in systolic blood pressure was 0-10 mm Hg in 83 cases, 11-20 mm Hg in 63 cases, 21-30 mm Hg in 45 cases, 31-40 mm Hg in 39 cases, 41-50 mm Hg in 15 cases, and over 50 mm Hg in five cases. The only countermeasure employed for hypotension was to raise the foot of the trolley, and this was done in eight cases. In hypotensive patients some rise in blood pressure was usually noted at the end of the examination and normal blood pressure was restored 30-60 minutes later.

COMPLICATIONS

The only persistent complication in the whole series was thrombophlebitis at the injection site in one case. Patients were questioned or observed with the following possible side-effects of the drugs in mind: nausea or vomiting, seven cases; faintness, two cases; headache, two cases; dreams and hallucinations, none; dizziness, none; tremor, none; shivering, none; muscular rigidity, none.

Side-effects of droperidol and fentanyl

The alpha-adrenergic blocking action of droperidol was probably the main cause of hypotension observed in some of the cases reported. The condition of these patients never gave rise to anxiety, presumably because the fall in blood pressure resulted from peripheral vasodilatation, which meant that tissue perfusion was well maintained. Intravenous fluids in the form of dextrose 5% or dextran may be given if it appears necessary to do more than elevate the legs. In patients with an initially high blood pressure the use of a smaller dose of droperidol or an alternative form of analgesia should be considered. Psychic disturbances have been reported with droperidol, usually in prolonged dosage; they are rare when fentanyl is given as well and probably rarer still when diazepam is also used. It is possible that the one patient in this series who felt unable to

breathe during intubation comes into this category. The action of droperidol is occasionally prolonged and patients should be warned not to drive or operate machinery for 48 hours.

Respiratory depression is the main side-effect of fentanyl. Particularly slow and shallow respiration occasionally observed in this series was partly due to the dissociated mental state because the patients always breathed more energetically when asked to do so. Respiratory depression from fentanyl overdosage is reversible with nalorphine (Lethidrone) 2-10 mg intravenously or the more recently introduced naloxone (Narcan) 0.4 mg intravenously. Muscular rigidity, especially of the chest wall, occurs occasionally with the use of fentanyl but was not met with in the course of the trial, possibly because diazepam was given in addition. Slow administration of fentanyl diminishes both the magnitude of respiratory depression and the tendency to muscular rigidity.

Discussion

Pennisi and Darin (1970) reported 48 cases in which neuroleptanalgesia was used for gastroscopy, and Egel and Gaines (1971) employed neuroleptanalgesia for 135 cases investigated with the gastroscope. Despite the favourable results obtained by these authors, neuroleptanalgesia for gastroduodenoscopy has not been subsequently reported, although it has been used for oesophagoscopy and bronchoscopy (Foldes and Maisel, 1970; Keller *et al.*, 1975). In none of the series reported has the endoscopist employed neuroleptanalgesia without the assistance of an anaesthetist. Reed *et al.* (1971) used the neuroleptic drugs for gastroscopy, but only as premedication.

This trial has shown that neuroleptanalgesia gives extremely good results when employed for gastroduodenoscopy. In 250 cases there has been no mortality, virtually no complication, and a high standard of analgesia has been obtained. In the vast majority of cases intubation was carried out with little or no disturbance to the patients who remained calm and comfortable throughout the examination, their relaxed aspect being in striking contrast to the restlessness and tense appearance of most patients sedated with diazepam or pethidine. The peaceful atmosphere which results is correspondingly more conducive to accurate and detailed endoscopic observation.

The results also show that neuroleptanalgesia can be used with safety by an endoscopist working without an anaesthetist.

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planning the trial and to Mr A. J. Lamerton who performed a number of the endoscopies.

References

- Egel, P. M., and Gaines, H. R. (1971). Cooperative gastro-camera study with intravenous Innovar. *Illinois Medical Journal*, **140**, 214-216.
- Foldes, F. F., and Maisel, W. (1970). Neuroleptanalgesia for peroral endoscopy. *Archives of Otolaryngology*, **91**, 280-283.
- Keller, R., Waldvogel, H., and Herzog, H. (1975). Neuroleptanalgesia for bronchoscopic examinations. *Chest*, **67**, 315-319.
- Pennisi, G., and Darin, G. (1970). L'impiego della neuroleptoanalgesia nelle indagini di gastroscopia. *Acta Anaesthesiologica (Padova)*, **21**, 15-22.
- Reed, W. D., Hopkins, B. E., Joske, R. A., and Laurence, B. H. (1971). A comparative study of conventional premedication (pethidine, promethazine, and atropine) and neuroleptanalgesia (droperidol and phenoperidine) for peroral endoscopy. *Gut*, **12**, 736-738.

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