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# Audit on preoperative midazolam and level of sedation

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## Abstract

We wished to observe by carrying out a prospective clinical audit, the level of sedation and time interval of all adult elective surgery patients. We enrolled adult ASA I-III patients who came for elective surgery to the Aga Khan University Hospital preoperative surgery suite for 3 months.

Hundred patients were enrolled. The majority of patients got 7.5 mg of PO Midazolam. Our median Ramsay sedation score was 2 and the Median drug to door time was 52.35 minutes. 11 patients were reportedly 'drowsy' in the recovery room one hour after surgery was completed. These were mostly the same patients who had a higher (Ramsay V) sedation score in the preoperative period (p =0.36). There was no significant difference in the 2 midazolam dosages and the Ramsay sedation score (p=0.12). We concluded that our sedation score is too low and our median time interval is too long making most patients coming for surgery under sedated. We recommend calling the patients in the OR suite one hour prior and the dosage being prescribed by the primary anaesthetist in order to keep this standardized.

**Keywords:** Midazolam, Ramsay sedation score, Recovery room, Under-sedated.

## Introduction

Preoperative Oral Midazolam HCI syrup is used commonly for sedation in the dose of 0.3- 0.5 mg/kg. It has been associated with respiratory depression and respiratory arrest, especially when used for sedation in noncritical care settings.[1] Incidents of airway obstruction, desaturation, hypoxia, and apnoea, most often when used concomitantly with other central nervous system depressants (for e.g. opioids) have also been reported.[2] Midazolam HCI syrup should be used only in hospital or ambulatory care settings that can provide for continuous monitoring of respiratory and cardiac function.[3] Immediate availability of resuscitative drugs and age and size appropriate equipment for ventilation and intubation, and intubation, and personnel trained in their use and skilled in airway management should be assured.[4] Any higher dosage can result in a greater amount of sedation, hypoventilation, hypoxia, inability to protect ones airway due to diminished reflexes, potential brain damage.[5] Currently, patients who are coming for elective surgical procedures are required to visit the Preoperative anaesthesia clinic or are seen the night before surgery by the on call anaesthesia resident. It is here they are prescribed an anxiolytic, usually in the form of oral midazolam, a benzodiazepine.[6,7] This is usually to be given as per instructions from the physician an hour prior to 'call for surgery' which means from the ward by the Day care nurse. However it often takes a while to be delivered by the Pharmacy which means that the actual drug is administered a few minutes before the patient is moved. Often there are delays after the drug is given till the patient actually is wheeled in for surgery and the peak effect may have passed. In our setting we often see patients arriving to the OR suite in varying degrees of drowsiness.[8] For a patient to be optimally sedated they should have a full Glasgow coma scale of 15/15, however drowsy they may be.[9] However, we have seen some patients who may be deeply sedated or even obtunded. This in return can result in an unfavourable outcome as mentioned above. We undertook this clinical audit in order to evaluate the following objectives:

We desired to estimate whether all adult patients coming for elective surgeries are adequately sedated with oral midazolam or not and to estimate the time taken from drug administration to entry into the operating room.

We attempted to do this by documenting the level of sedation (Ramsay Sedation Score) in all adult patients who were coming for elective surgery who have received PO Midazolam and correlated this to the dose and drug- to -entry to the operating room time (drug to door time). We also noted their level of drowsiness in the recovery room.

## The Problem highlighted:

Patients receiving PO Midazolam often have an inadequate level of sedation or a Ramsay Score, when called into the operating room (OR).

## Defining the Standard of Care:

The standard of care expected from midazolam premedication prior to surgery is "anxiolysis with minimal sedation or a Ramsay Score of 3, and a full GCS". The Standard time (drug to Operating room door) is 30-45 minutes.[5,10]

## Ramsay Score Definition:

Ramsay I: anxious or restless or both; Ramsay II: cooperative, oriented and tranquil; Ramsay III: responding to commands; Ramsay IV: brisk response to stimulus; Ramsay V: sluggish response to stimulus; Ramsay VI: no response to stimulus.

## Patients:

This was a prospective, clinical outcome audit of practice. The inclusion criteria included arbitrarily selected ASA (American Society of Anaesthesia status) I-III adults receiving PO Midazolam preoperatively. The exclusion criteria were all paediatric patients age fifteen years and below as well as all patients with any other reason for a higher level of sedation (Ramsay Score of 5-6), such as head injury or neurological pathology; as well as all ASA IV patients, emergencies or above.

Our setting was the preoperative area of the OR suite of the Aga Khan University Hospital. All patients admitted to the preoperative bay for surgery during elective working hours, i.e. 8 am to 5 pm Monday to Friday were enrolled. Data was collected using an audit proforma (appendix) was filled for these patients obtaining all pertinent information. Patients were also followed up in the recovery room post operatively to assess their levels of sedation. Data was collected for three months from 1st June 2010 till 5th September 2010.

We ensured patient confidentiality by excluding identifying name of all patients and assigning serial numbers to all patients along with their medical record numbers. These numbers were not mentioned in the final audit report.

# Methods and Results

## Sample size and sampling method:

Sample size could not be calculated to power the study due to the lack of previous audits in this field. However we undertook enrolling patients for 3 months on a daily arbitrary basis.

## Data Analysis:

All data was entered into SPSS version 17 and analyzed at the end of the audit. Chi square analysis was carried out in order to assess the significance (p value) between the two drug dosage groups as well as the preoperative Ramsay score and the post operative drowsiness level.

One hundred randomly selected patients were included in the audit (n=100). These were all ASA I-III electively admitted patients coming to the Preoperative holding area during normal working hours (8am - 5pm, Mon- Fri). The data was collected from the patient's preoperative Anaesthesia chart, day care or ward nursing flow sheets and medication records. Patient anonymity was maintained at all times by recording the medical record number (MR) and serial number to each patient and not the name. Time for going into surgery was also recorded by the Data recorder. The median age was 42 years (+/- 16.43 yrs); Male to female ratio was 41: 59; 50 patients were ASA II, 47 were ASA I and 3 were ASA III. There were 2 dosages used of PO Midazolam- 3.75 mg and 7.5 mg. 70 patients were given 7.5 mg and the rest were given 3.75 mg. There were no reasons stated in the Preoperative anaesthesia chart of why the dosages were chosen and were assigned by the Preoperative anaesthetist. The median time from drug administration till patient being taken to the OR (drug to door time) was 52.35 minutes.

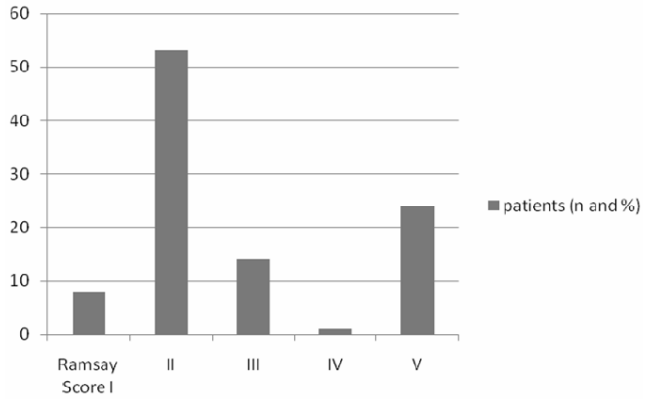


Figure-1: Patients and Ramsay score.

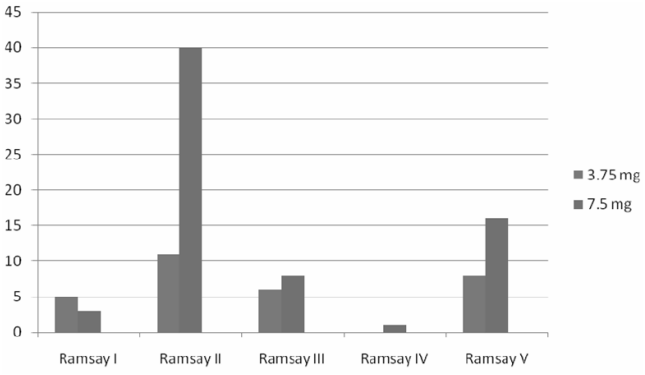


Figure-2: Midazolam dose and Sedation score.

Figure-1 is a bar chart depicting the different Ramsay scores of the patients according to their level of sedation. 53 patients (the mode) were cooperative, oriented and tranquil (i.e. Ramsay II) where as 24 patients (the second highest) had a sluggish response to stimulus (Ramsay V). Ramsay sedation scores according to the two different midazolam dosages were as in Figure-2.

Eleven patients (n and %) were reportedly 'drowsy' in the recovery room one hour after surgery was completed. On

sub stratification, these were mostly the same patients (71%) who were Ramsay V in the preoperative period (p =0.36). There was no significant difference in the 2 midazolam dosages and the Ramsay sedation score (p=0.12).

However, it was noticed as predicted, that as the time interval grew, the preoperative Ramsay sedation score was deeper (p= 0.02) which was statistically significant.

## Conclusions

We gather the following conclusions from the results of our data; there are 2 different Midazolam dosages used (3.75mg and 7.5mg), apparently randomly, for premedication; the median sedation score is sub optimal (Ramsay II) as compared to the standard (Ramsay III); the median time (drug to door) till surgery is longer than is the standard (52.3 minutes vs 45 mins); as this time increases, the Preoperative sedation score increases to higher than optimal levels and the sedation score corresponds to the post operative drowsiness level.

Based on our findings we recommend the following changes:

1. Due to the erratic nature of drug prescription which may cause under-dosing or overdosing, the anxiolysis should be prescribed directly by the Primary anaesthetist who will do the case (Consultant). This can be done either one hour prior to each case during the day and can be done the night before by phone for the first case.

2. If the midazolam is dispensed to the patient after they reach the preoperative suite one hour prior to surgery, the pharmacokinetics can be better controlled under supervision of the primary anaesthetist. Drug dosage, timing of drug administration and time to go into the OR can be better monitored. This will require coordination with the Pharmacy and nursing staff as well as better communication with the surgeons as with the OR coordinators. An action plan can be formulated after review of this audit report and added as an addendum to the report.

3. Re auditing is essential in order to complete the audit loop and implemented changes can be incorporated into the final results. Outcomes and objectives will remain the same as the present ones.

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