

A COMPARATIVE MICROBIOLOGICAL STUDY WITH PROPOFOL AND ETOMIDATE

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SUMMARY : *We investigated potential risks for any kind of contamination of propofol and etomidate in this study. After noting their lots, 18 ampules of each drug were aseptically opened. Samples were incubated after different time intervals. Two different sorts of culture media were chosen for incubation; sheep blood agar and thioglycollate broth for aerobic and anaerobic microorganisms, respectively. Number of positive samples for propofol showed a marked increase as a function of time. Unlike propofol, no bacterial growth was observed in etomidate.*

We, hereby conclude that extrinsic contamination was more important than intrinsic for propofol.

Key Words : *Anaesthetics, Intravenous Administration, Propofol, Etomidate, Microbiology, Bacterial Growth.*

INTRODUCTION

Raymond C. Roy presented the good, the bad and the ugly for propofol in his study (Raymond, 1990). Rapid onset and recovery is the good, broad dose response curve is the bad and potential for any extrinsic contamination is the ugly for propofol. Even if the lipid emulsion formula of propofol is a good culture medium, one of the most important factors for contamination is the anesthesia staff. The purpose of this study is to determine if propofol, compared with etomidate, would incur bacterial growth.

MATERIALS AND METHODS

Eighteen ampules of propofol and etomidate were aseptically opened in the operating theatre, after noting their lots. Two milliliters of drug solution from each of them were meticulously drawn into fo-

ur sterile syringes labeled as 0h, 24h, 48h and 72h (Group 1). Remaining solution in the ampules were drawn at 24h, 48h and 72h (Group 2). They were cultured with respect to their labels. Two different sort of culture media were chosen for incubation; sheep blood agar and thioglycollate broth for aerobic and anaerobic microorganisms, respectively. Dispersion into the agar plate was provided as single colonies at 37°C. Microorganisms were identified according to their colony morphology, microscopic features, referring to their gram staining and biochemical reactions after 48 hours for this procedure. As for thioglycollate broth tubes, the results were assessed after 4 days. Positive samples, which showed no aerobic bacterial growth were directly considered to be anaerobic.

RESULTS

We have performed a total of 504 incubations

for both propofol and etomidate groups. Whilst samples incubated immediately showed no bacterial growth, 27 out of 252 samples for propofol were positive as shown in Fig 1. The distribution of microorganisms are shown in Fig 2.

As indicated in Fig 3, there was 1 (2.77 %) growth at 24h, 2 (5.55 %) at 48h and 5 (13.88 %) at 72h in group 1, and 2 (5.55 %) at 24h, 8 (22.22 %) at 48h, 7 (19.44 %) at 72h in group 2.

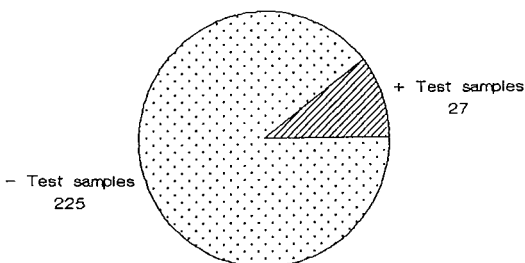


Fig 1 : Total amount of bacterial growth for propofol.

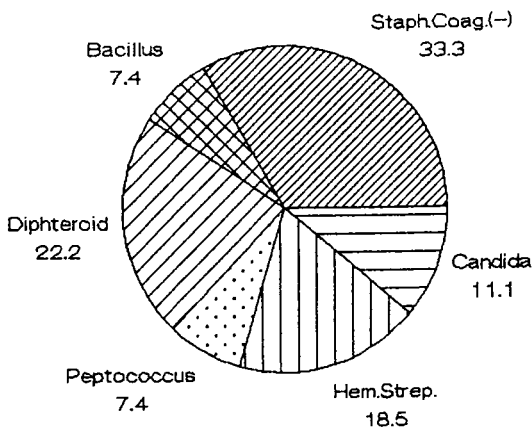


Fig 2 : Percentage of distribution of microorganisms (n = 27).

Unlike propofol, no bacterial tests were positive for etomidate groups.

DISCUSSION

Propofol formulated as a lipid emulsion contain-

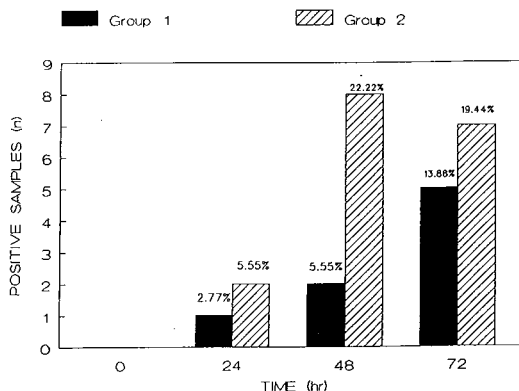


Fig 3 : Bacterial growth in propofol (n, %).

ing soybean oil, glycerol and egg phosphatide can be easily contaminated (Raymond,1990). Recent reports seem to support that multiple postsurgical infections were induced by the utilisation of propofol (Thomas, 1991). On the contrary, we were unable to find out any report indicating a similar problem for etomidate.

We performed this study with two different intravenous agents like propofol and etomidate because of the difference in their formulations.

Many investigators are trying to draw our attention to the importance of aseptic handling techniques for propofol (Downs, 1991). According to a report published by Centre for Disease Control, the failure to maintain aseptic standards during preparation and administration of propofol was due to the medical staff (Patterson and Hopkins, 1990).

In ICU pharmaceutical group's research only two (0.098 %) samples tested positive among 2040 (Goodale, 1991). Similarly, samples immediately incubated showed no bacterial growth in our study. Thus, potential for intrinsic growth appears to be impossible and manufacturing of propofol is of the highest quality possible.

Additionally, contamination was found to be extrinsic in Mc Leod's study (Mc Leod et al. 1991). Our data are almost consistent with his findings related to the distribution of microorganisms.

We feel that one of the most effective factors for potential contamination may be medical staff, because difteroids and staphylococci, regarded as common pathogens of the skin, are considered res-

possible from bacterial growth.

Another reason for extrinsic contamination seems to be the falling of glass particules into the ampule upon opening (Furgang, 1974). As propofol ampules are prepared to be opened by snapping instead of the breaking technique; referring to the line on the neck of the ampule, we believe that this risk is out of question.

We, hereby conclude that medical staff should principally prepare and administer any kind of drug under sterile conditions, as it is extremely important for propofol. Therefore, we wish to emphasize the features of aseptic technique referring to Goodale's paper (Goodale, 1991) :

- Prepare just prior to each procedure
- Withdraw contents immediately after opening
- Administer promptly
- Complete administration maximum in 24 hours
- A single ampule of propofol could be used on multiple patients, if aspirated aseptically into separate syringes immediately upon opening of the ampule
- Aseptic technique is essential during preparation of propofol infusions and syringes.

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