

## 4. DISCUSSION

The associated structures of the anesthetic equipments are uniquely predisposed to contamination by various microorganisms, mainly bacteria, virus, fungi and parasites.

It is done to assess efficiency of sterilization of anesthetic equipment prior to use .The study also conducted to determine the sensitivity of the isolated bacteria to different antibiotics. Swabs were taken from different types of anesthetic equipments when they were ready to be used in the intensive care unit.

Ten different types of anesthetic equipments were included in this study. A total of 200 samples were collected These selected items included face mask, air ways, laryngoscope blade, suction catheters, tracheal tubes, magill intubating forceps, connection machine line, anesthetic machine line, Emo-Bags, and tracheal tube cuff. The samples were cultured and the bacteriological examinations were preformed according to the international standard Methods. Both Gram-positive and gram-negative bacteria were isolated and identified using different biochemical tests.

A percentage of 26.5 of the collected swabs were found to be significant for bacterial growth, and (73.5%) of the swabs failed to demonstrate any bacterial growth.

It was noticed that the rate of contamination of the anesthetic equipments was higher in the suction catheters (or tube), face mask, airway, laryngoscope blade and magill intubating forceps. This can be explained by the fact that all those equipment have direct contact with the normal flora of the respiratory tract. Such finding will be of help to give much care in the sterilization or disinfect ion of those items.

Different species of the bacteria were isolated from the anesthetic equipment. *Pseudomonas* represents (60.38%) of the isolated species.

This is quite acceptable because of the fact that *Pseudomonas* is well known to be resistant to most of the used disinfectants and antibiotics.

Luckily, enough *Pseudomonas* is not very invasive and it causes infections in certain group of patients. Still as an opportunistic *Pseudomonas* play an important role in nosocomial infections. The isolated gram-positive *Cocci* represent (20.75%) of the isolates. This is explainable by the fact that most of commensals of upper respiratory tract are from this group of bacteria. *Bacillus* group is well known to contaminate the whole environment because they are spore forming.

However, most of this group are non-pathogenic and may only help to act as an indicator of the presences of the other spore forming anaerobic bacteria namely *Clostridia*.

To reduce this percentage of contamination, it is recommended to use bacterial filters. A recent study in anesthesia and analgesia showed that (33 %) of the anesthetic equipments, surfaces were contaminated with blood and that visual inspection was not a reliable means of detection (James & Hall, 1994). Therefore, reusable items should be rinsed to remove blood and secretions as soon as possible after use, and must be decontaminated prior to reuse by thorough cleaning, followed by either sterilization process or high-level disinfection (Rutala, 1996).

Out of the 53 strains of bacteria isolated from 10 different types of the anesthetic equipment, 25 strains were selected (11 *Pseudomonas. spp*, seven *Bacillus. spp.* and seven *Cocci. spp.*) for antibiotic sensitivity testing.

These strains were subjected to in vitro anti-microbial sensitivity tests using the disc diffusion method.

The results in table 11 showed that the in vitro anti -microbial drug used for the *pseudomonas spp.* were found to be sensitive to Ciprofloxacin, Amikacin, Ofloxacin, Pefloxacin and resistant to Ampicilin, Cefoperazone, Ceftazidime ,Cefotaxime, Ceftizoxime, Piperacillin, Gentamicin and Augmentin This agrees with the result of (Villavicencio, *et al.*, 1989 ) in their prospective randomized controlled study.

From table 9 the strain of Gram- positive *Bacilli* isolated strains from the anesthetic equipments, were mostly sensitive to Gentamicin, Ciprofloxacin, Roxythromycin, Ofloxacin, Pefloxacin and intermediately sensitive to Cephalexin, Ceftriazone and resistant to Cefotaxime, Lincomycin and Ampicillin. For the gram- positive *Cocci* isolated strains the study shows that they are sensitive to Ciprofloxain, Gentamicin, Ofloxacin, Pefloxacin and intermediate sensitive to Ceftriaxime and resistant to Cephalexin, Ampicillin, Lincomycin, Cefotaxime and Roxythromycin .It was clear that the Gram positive *Cocci* were resistant to the commonly used Penicillin and Cephalosporin. More over the presence of such organisms on the anesthetic equipments may be the cause of infection in some of the patients. One should put in mind the sensitivity of such organism when prescribing antibiotics and after operations.

## 5. CONCLUSION & RECOMENDATIONS

### 5.1.CONCLUSION:

From the study, different species of bacteria were isolated from the different anesthetic equipments.

This contamination depends on the materials and devices used for cleaning and disinfecting of anesthetic equipments, and the way of doing it. Moreover, the machines and/or the sterilizing agents used for sterilization of the anesthetic equipments and the way of storing the items after sterilization could also affect the efficiency of the sterility. In addition, the procedure of the sterilization and the way of handling during operations have a great risk of contamination. One more main factor, which also affects the sterilization, but unfortunately being neglected by almost all the hospitals in this country, is the crossing between the dirty and clean corridors. This crossing causes cross contamination.

The most commonly contaminated anesthetic equipments in this study were found to be suction catheters, facemasks, airways, laryngoscope blade and magill intubating forceps.

The isolated strains both gram negative and gram-positive bacteria, were found to be mostly sensitive to Ciprofloxain, Pefloxacin and resistant to Ampicillin, Cefotaxaime.

## **5.2.RECOMMENDATIONS**

- Anesthetic instruments should be prepared in sets rather than individual to avoid cross contamination.
- Crossing between the dirty and clean corridors should be avoided when designing hospital.
- Personnel should avoid immersing the anesthetic instruments in the Cidex for more than the required time, so as not to reduce its life.
- Special tools and machines for cleaning should be used instead of the traditional methods.
- Methods of sterilization of the different components of anesthetic components should be revised.
- Further extensive studies are recommended in this field to throw light on this important issue which may threaten the life of patient undergoing surgery or any procedure which require the use of anesthetic equipment

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