

A POSSIBLE CAUSE OF POSTOPERATIVE INFECTIONS

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Infections which develop postoperatively have always been a problem for surgeons. Over the course of the years many of the causes of these infections have been eliminated. However, in spite of proper sterilization and good scrubbing techniques, postoperative infections still arise and, in spite of antibiotics, these infections may result in a poor prognosis for the patient. In this article we are presenting some evidence which indicates how surgeons themselves may be the cause of some infections during operations.

Material and Methods

Tests were made in operating rooms which were clean and ready for surgery in order to eliminate as completely as possible the danger of contamination by organisms from the room. The tests involved 70 sterile Petri plates and ten different men. The Petri plates were placed in the operating rooms from 15 to 20 inches distant from the mouths of the men participating in the test and were exposed from three to five minutes. Fifty of the Petri plates were divided into two large groups of 25 each.

Each of these groups was further divided into five groups of five each, according to the covering or uncovering of the faces :

1. first five tests — the men did not wear any masks
2. second five tests — the men used masks but did not cover their noses
3. third five tests — the men used masks and covered their noses
4. fourth five tests — the men used two masks and covered their noses

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5. fifth five tests — the men used two masks with a plastic sheet in between and covered their noses

In the first group of 25 tests the men did not talk during the exposure of the Petri plates.

The second group of 25 tests was set up in the same manner as the first, being divided into five groups of five following the scheme indicated above, but in this group of tests the men talked during the exposure of the Petri plates.

The last twenty plates were exposed to a man who had an upper respiratory infection and a runny nose, ten when he talked and ten when he was silent, two plates each according to the five groups shown in the scheme above.

Results

There was a great difference among the various groups as can be seen from table 1. A surgeon with an upper respiratory infection

TABLE 1

A COMPARISON OF THE NUMBER OF COLONIES OF ORGANISMS FOUND ON PETRI PLATES EXPOSED TO PERSONS TALKING AND QUIET WITH A VARIETY OF FACE COVERING

RESULT IN NUMBER OF COLONIES OF ORGANISMS				
Type of Face Protection	No. of Plates	Quiet	No. of Plates	Talking
No Mask	5	147	5	231
One Mask and Nose Uncovered	5	59	5	80
One Mask and Nose Covered	5	18	5	30
Two Masks and Nose Covered	5	12	5	15
Two Masks and Nose Covered and Plastic Sheet Between	5	2	5	2
Total (Excluding U.R.I.)	25	238	25	358
Upper Respiratory Infection *	10	107	10	242
Total (Including U.R.I.)	35	345	35	600

who talks in the operating room is much more dangerous to the patient than one who does not. As can be seen from this table, a total of 238 colonies were found on the non-talking plates and 358 on the talking plates, excluding the plates exposed to the man with an upper respiratory infection. If these plates are included, the total colony

* Man with upper respiratory infection exposed two plates with each kind of face protection.

count is 345 on the non-talking plates and 600 on the talking plates. As many colonies were found on the ten plates exposed to the man with the upper respiratory infection, while talking and, with a variety of types of face protection, as were counted altogether on the first 25 plates exposed to individuals with a variety of types of face protection but not talking.

As can be seen from Table 1, the colony count rapidly increased in the plates exposed to talking persons, especially with the first two types of face protection. The colony count gradually decreased with the third and fourth types of face protection, in the plates exposed to both talking and non-talking persons, until a total of only two colonies were found on the last plates, (protection with a double mask and a plastic sheet between the masks), in both the talking and non-talking series.

Table 2 gives a list of all the types of organisms found and their frequency. As can be seen, *Staphylococcus albus* coagulase negative, and hemolytic *Staphylococcus* coagulase negative, made up 84 per cent of all the colonies found. The difference between the talking and the non-talking plates seems highest for the gram-negative rods and *Bacillus subtilis*.

TABLE 2

A COMPARISON OF THE ORGANISMS FOUND ON THE PLATES EXPOSED TO TALKING AND QUIET PERSONS WITH A VARIETY OF FACE COVERING

	Common Organisms Found	Quiet	Talking	Total
1.	<i>Staphylococcus albus</i> Coag. Neg.	180	290	470
2.	Hemolytic <i>Staphylococcus</i> Coag. Neg.	125	196	321
3.	Gram Negative Rods	9	39	48
4.	<i>Bacillus subtilis</i>	8	27	35
5.	<i>Staphylococcus aureus</i> Coag. Pos.	6	14	20
6.	<i>Staphylococcus aureus</i> Coag. Neg.	10	8	18
7.	Gamma Streptococcus	5	10	15
8.	Fungus	—	5	5
9.	Gram Positive Rods	1	3	4
10.	<i>Proteus</i>	2	—	2
11.	<i>Rhizopus</i>	1	—	1
12.	Unknown	1	—	1

Conclusion

In the case of persons in an operating room during an operation, the old saying «silence is golden» is appropriate. Silence during an operative procedure is very important and may save the patient (and the surgeon) from many avoidable complications. Certainly the surgeon must talk some during the procedure of an operation, but we believe that this should be limited to a minimum. Another point to be made is that persons in an operating room should wear masks that cover the nose. The surgeon with an upper respiratory infection should not participate in an operation unless absolutely necessary, and in that case he should wear two masks, preferably with a plastic sheet between them.

Summary

A series of tests were made to determine the cause of some infections that develop in patients postoperatively. A number of Petri plates were exposed to people in clean operating rooms, these persons wearing a variety of types of face protection. One half of the plates was exposed to people talking and the other half was exposed to people not talking. A series of twenty Petri plates was exposed to a man with an upper respiratory infection, both talking and not talking. As a result of the colony count of organisms from these Petri plates, it was possible to determine that many more bacteria were spread by talking people than by non-talking people, although in the two groups wearing the greatest amount of face covering the colony counts were about the same for talking and non-talking. It was concluded that, at the very least, anyone in the operating room should wear a mask which covers the nose and that a person with an upper respiratory infection should not participate in an operation unless absolutely necessary, and then he should wear a double mask, preferably with a plastic sheet between the two masks. It was shown that the talking person with an upper respiratory infection produced as many colonies, or more, on ten Petri plates as were found on 25 plates exposed to people without upper respiratory infections, non-talking and with a variety of face coverings, including none. Staphylococcus albus, coagulase negative, and hemolytic Staphylococcus, coagulase negative, made up the greatest majority of the organisms found.