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RESEARCH ARTICLE

Effect of diagnosis X-rays on oral bacterial survival and their sensitivity to some antibiotics.

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Abstract

Out of prescreening of referenced patients *Staphylococcus*, *Streptococcus species* and *E.coli* were isolated from contaminated dental in Erbil (16, 16 and 6 respectively). About 50% of isolated *staphylococcus* was resistant to all of tested antibiotic Vancomycin, Chloramphenicol, Ciproflaxin, Amoxicillin, Tetracycline (VA, C, CIP, AX and Te), but converted to sensitive after using X-ray dental diagnoses (100%). Farther, results of cultivation suggested flexibility of nuclear mutation. While, remained 50% Gram positive *Staph.* remains sensitive after exposure to radiation similar, results investigated in isolated *Strep. species* (40%) when exposure to radiation. Respectively, *E.coli* isolates had lesser positive response (10%) to radiation exposure. While the cell density in cell suspensions did not decrease in spite of a significant reduction in the viable counts (from 8×10^8 to 6×10^8 CFU/ml). That is mean using X-ray exposure should be affect on the total oral bacterial viability and Gram positive bacteria, seem to imply higher mutant than gram negative bacteria.

Introduction:-

X ray is a form of electromagnetic spectrum, except that they are more energetic than light rays and are invisible to the human eye. X-rays have a wavelength in the range of 0.01 to 10 nanometers, corresponding to frequencies in the range 30 pet hertz to 30 extra hertz (3×10^{16} Hz to 3×10^{19} Hz) and energies in the range 120 eV to 120 keV[1]. X-rays pass easily through air and soft tissue of the body. The doses of radiation received in most X-rays are quite similar to the environmental (background) radiation one is exposed to simply by living on Earth. Although unnecessary X-ray should be avoided, in most cases, the benefits of X-rays greatly outweigh the potentially small increased risk of exposure [1-3].

X-ray beams are popularity and used by dentists in considering diagnosis before and after process of dental treatment. Dosage due to dental X-rays varies significantly depending on the procedure and the technology [4].

Recently, a study was resulted that bacterial counts after treatments displayed a linear relationship with the total count of bacteria before treatments as well as the percentage surviving bacteria and irradiation time [5]. Whatever a large bacterial number found in human mouth [6], which could be changed their response to antibiotics by physical energy [7]. The purpose of the present work was to estimate the effect of dental X-ray on oral bacteria and their response to some antibiotic in Erbil population

Material and methods:-

1. Randomly 30 patents collected from whom referred to Erbil dental collage.
2. Dental samples were taken by sterile cotton sticks before and after X-ray exposure (OPG and Probe model or film-based system).
3. Cultivation on brain heard broth media

4. Total viable cell counts before and radiation were done by serially dilution with a sterile 0.9% NaCl solution and spread on nutrient agar plates. The plates were incubated at 37°C for 24 hr., and cells were enumerated. Cell density was measured at 600 nm using spectrophotometer [8].
5. Cultivation on Blood and MacConkey agar.
6. Isolation, identification and sensitivity test of bacteria.

Results and discussion:-

Prescreening of referenced patients contamination dental isolates were Gram positive *Staphylococcus*, *Streptococcus* species and *E.coli* (16, 16 and 6 respectively). Results of sensitivity tests for isolates bacterial against used antibiotics showed variable responses. About 50% of isolated staphylococcus (8 isolates) was resistant to all of tested antibiotic (VA, C, CIP, AX and Te) before exposure to radiation, but radiation exposure causes conversion to sensitivity (100%) after 24 hrs incubation. However, the bacteria have a very small genome, so it makes a target for either cell killing or mutations during diagnostic doses of X-rays. Fartherly, subculture done for the mutant isolated bacteria after three days. The results of cultivation suggested flexibility of nuclear mutation. While, remained 50% Gram positive *Staph.* species were sensitive to same antibiotic and remains sensitive after exposure of radiation.

Only forty from percent of isolated Strep. species were sensitive to the same tested antibiotics and converted to resistant which mean positive effect to radiation exposure. Respectively, *E.coli* isolates had lesser positive response (10%) to radiation exposure. Both *Strep.* and *E.coli* isolated were kept their antibiotic responses.

The inactivation patterns of the X-ray radiated cells were investigated in prepared cell suspensions of a Gram-negative and Gram positive bacterial strain, comparing before and after exposure. It was observed that cell density in cell suspensions did not decrease in spite of a significant reduction in the viable counts (from 8×10^8 to 6×10^8 CFU/ml). This may be due to the fact that the X-ray treated cells were not completely lysed even when they inactivated by radiation, and thus the cell density did not decrease. These results were agreed with other researcher team in Korea [9].

Finally, results of the study can concluded that the dental diagnoses using X-ray exposure should be affect total oral bacterial viability and Gram positive bacteria seem to imply higher mutant than gram negative bacteria.

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