RESEARCH ARTICLE

Assessment of Bacteriological Quality of Drinking Water available in Dental Clinic in Akola City, India

Banginwar YS and Dawande AY

Department of Microbiology, Arts And Science College, Pulgaon, India.

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ABSTRACT

A study of bacterial contamination of 85 water samples was conducted in monsoon for 31 dental clinics along with one dental college unit in Akola city and reported prevalence of diverse groups of bacteria. A few bacteria were detected in the tap water upstream, scalar line, high speed hand piece and three war syringes of the clinics. The Gram positive cocci and Gram negative bacilli were observed predominant including *E. coli, Salmonella typhimurium* and *Staphylococcus aureus.*

Keyword: Dental clinic, *E. coli, Salmonella typhimurium, Staphylococcus aureus.*

INTRODUCTION

Presently, Dental clinics are well equipped with compressed air and water pipes. Water is used as an air turbine coolant for washing purpose when teeth are scraped or extracted and also for mouth rinsing and gargling. It was pointed out that the water delivered to dental clinics and dental college is often contaminated with microorganisms. In India, chlorinated water is provided to dental clinics and lays down minimum levels for residual chlorine in water, but in practice, several dental clinics do not use the chlorinated water.

Dental unit waterlines are an integral part of dental surgery equipment, supplying water as a coolant for air-turbines. These waterlines are susceptible to biofilm formation because they are made from a variety of plastic materials. The plastic surfaces promote growth of bacteria in the biofilm. Therefore it is proposed to assess the quality of drinking water available in dental clinic of Akola city for prevalence of bacteria.

MATERIALS AND METHOD

***Collection of water sample from the various Dental clinics*:**

Altogether 85 water samples (each sample was about 25-30 ml) were obtained from the study area in sterile bottle in hygienic condition as the standard norms of drinking water for examination. The above water samples were collected by using syringe, high-speed hand piece, scalar line, overhead tank water line and water reservoir. These samples were examined for prevalence bacterial contamination on CLED (Cystein lactose electrolyte deficient) agar medium.

***Isolation of bacteria on CLED agar plate*:** A drop of water from collected sample was immediately placed on the CLED agar plate and allowed to then incubate the plate for 24 hours at 37^0 C. The growth and colour of colonies on the plate were observed for 48 hours.

***Identification of bacteria*:** Isolates of bacteria were identified on the basic of morphology, Gram staining, motility, cultural characteristics, biochemical test and special tests.

RESULT AND DISCUSSION

The water from the entire dental clinic sample contained predominantly Gram negative bacilli and few gram positive bacteria. Previous report stated that the water use in dental clinic are sterilized or chlorinated and free from bacterial contaminants. The present survey revealed that most of clinics did not follow the proper hygienic condition,

Table 1: Survey of water samples from study area.

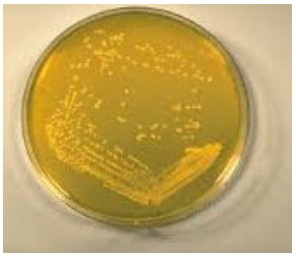
Total Water samples from study area			Water samples from dental clinic		
Total samples	Contaminated samples	Non-contaminated samples	Total dental clinic	Contaminated samples	Non-contaminated samples
85	29	56	30	21	09

Table 2: Assessment of contaminated water from dental clinic and Dental hospital

Culture no	Gram staining	Motility	Lactose fermentation	Mannitol fermentation	Indol test	MR test	VP test	Citrate	TSI agar H2S gas	Colonies on CLED agar	Identified organism
2C	-	+	AG	AG	+	+	-	-	-	Yellow	*E.coli*
2D	+	-	A	A	-	+	+	+	-	Yellow pin point	*S.aureus*
4C	-	+	-	AG	-	+	-	+	+	Bluish	*Salmonella typhimurium*
5A	+	-	A	A	-	+	+	+	-	Yellow pin point	*S.aureus*
5A1	-	+	-	AG	-	+	-	+	+	Bluish	*Salmonella typhimurium*
6E	-	+	-	AG	-	+	-	+	+	Bluish	*Salmonella typhimurium*
8B	+	-	A	A	-	+	+	+	-	Yellow pin point	*S.aureus*
8D	-	+	AG	AG	+	+	-	-	-	Yellow	*E.coli*
9C	+	-	A	A	-	+	+	+	-	Yellow pin point	*S.aureus*
10A	+	-	A	A	-	+	+	+	-	Yellow pin point	*S.aureus*
10B	-	+	AG	AG	+	+	-	-	-	Yellow	*E.coli*
10B1	-	+	-	AG	-	+	-	+	+	Bluish	*Salmonella typhimurium*
10C	-	+	-	AG	-	+	-	+	+	Bluish	*Salmonella typhimurium*
11D	-	+	-	AG	-	+	-	+	+	Bluish	*Salmonella typhimurium*
12C	-	+	AG	AG	+	+	-	-	-	Yellow	*E.coli*
14D	+	-	A	A	-	+	+	+	-	Yellow pin point	*S.aureus*
15C	-	+	-	AG	-	+	-	+	+	Bluish	*Salmonella typhimurium*
18A	+	-	A	A	-	+	+	+	-	Yellow pin point	*S.aureus*
20A1	-	+	AG	AG	+	+	-	-	-	Yellow	*E.coli*
21E	-	+	AG	AG	+	+	-	-	-	Yellow	*E.coli*
22B	+	-	A	A	-	+	+	+	-	Yellow pin point	*S.aureus*
25D	-	+	-	AG	-	+	-	+	+	Bluish	*Salmonella typhimurium*
27D	-	+	AG	AG	+	+	-	-	-	Yellow	*E.coli*
28A	-	+	AG	AG	+	+	-	-	-	Yellow	*E.coli*
29B	-	+	-	AG	-	+	-	+	+	Bluish	*Salmonella typhimurium*
29D	-	+	-	AG	-	+	-	+	+	Bluish	*Salmonella typhimurium*
29E	-	+	-	AG	-	+	-	+	+	Bluish	*Salmonella typhimurium*

E.Coil on MacConkey Agar

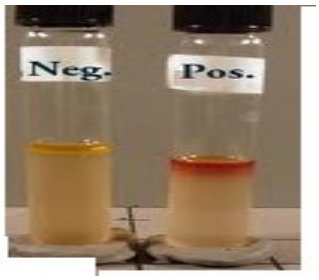
Salmonella typhimurium on MacConkey Agar



S.aureus on CLED media

Citrate test positive

TSI test positive



Indol test positive

did not use sterile/chlorinated water or those who use the same, the pipe line container, scalar line, three way syringe open to air may contaminated the sterilize water. Present report indicates the prevalence of *E.coli* in the water of dental clinic, which confirm the previous report.

The report also indicate the prevalence of Gram positive organism such as *Staphylococcus aureus* which are not inheriting of water, this contamination may due to oral cavity to hand piece to reservoir of water and scalar line then indicate that in dental clinics were may be contaminated in two different way either from contaminated reservoir or pipe line and supplied to patient generally Gram negative contamination and through oral cavity of patient to pipe line and reservoir.

CONCLUSION

The examination of water samples from different dental clinics and one dental college hospital in Akola city revealed that nearly 70 per cent dental clinics did not followed proper surgical procedure and avoid to use chlorinated or sterile water. Due to unhygienic surgical procedure and contaminated water, the patient attending the dental clinic may infected with hospital borne infection. Out of total study area, 21 dental clinics used pathogenic bacterial contaminated water containing *E. coli, Salmonella typhimurium* and *Staphylococcus aureus.* It is sorry to reveal that most of the dental clinic understudy did not use the sterile water and proper surgical procedure for the extraction of teeth, scraping and mouth rinsing.

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