

THE IMPACT OF STREPTOCOCCI ISOLATED FROM SOME FOODS OF ANIMAL ORIGIN ON PUBLIC HEALTH

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(Manuscript received 12 August 2003)

Abstract

Streptococci were among the most common isolates obtained from both food of animal origin and different infected sites of many patients of different ages. Aseptically, 64 milk samples from apparently healthy buffaloes and cows, 10 Kariesh cheese, 20 beef luncheon and 20 chicken luncheon in different localities at Kafr El-Sheikh Governorate were subjected to cultivation on blood agar for isolation of *Streptococcus spp.* Aseptically, 30 throat swabs and 20 ear swabs were obtained from children aged between 6 to 12 years in public hospital of the same locality. They were suffering from tonsillitis and otitis media, respectively, with high mean Erythrocyte Sedimentation Rate (ESR) on average about 38 mm. In addition, 18 urine samples and 7 vaginal swabs were obtained from adults in different private clinics, suffering from pyelonephritis and vaginitis, respectively. Twenty-eight from those patients were reacting positively with Antistreptolysin O (ASOT) in percentage of 37.4%. The results obtained during this study revealed the presence of beta, alpha and gamma hemolytic *Streptococcus spp.* in both foods of animal origin and different infected patients of different ages.

INTRODUCTION

Foodborne streptococcal human infection is a serious problem assuring that animal products, especially milk and meat and their products must be treated sufficiently by heat to prevent transmission of *Streptococci* for consumers, especially children, causing tonsillitis, otitis, arthritis and rheumatic fever. Hemolytic *Streptococci* that had been isolated from milk samples of mastitic cows revealed that 17.05% of them belonged to group B, 17.64 belonged to group A and 62.9% to group C (Filev, 1980).

Beta hemolytic *Streptococcus agalactiae* was identified as the most frequently isolated species from milk of mastitis cows (Mazura, 1989).

Outbreaks of food borne throat infection by group A beta hemolytic *Streptococcus* species occurred after consumption of boiled egg salad (Lossos *et al.*, 1992).

Microbial evaluation of Spanish cooked meat samples in university restaurants revealed isolation of Lance field group D streptococci in percentage of 24.6% (Soriano *et al.*, 2000).

Chronic adenotonsillitis and adenoid hypertrophy in children were common, and the predominant isolates were alpha, gamma, and beta hemolytic streptococci of group A, B, C and F (Brook, 1981).

Both foods of animal origin and inflamed areas of patients like tonsils having different types of hemolytic *Streptococcus spp.*

The present work was to evaluate the incidence of *streptococci* in different foods of animal origin and to find out their impact on the consumers.

MATERIALS AND METHODS

1. Collection of samples

Sixty-four milk samples, 10 Kariesh cheese, 20 of each of beef and chicken luncheon were aseptically collected from different areas and shops in Kafr El-Shiekh Governorate. Collected samples were transferred to the laboratory with minimum of delay for analysis. In addition, 75 samples were obtained from different infected sites of patient of different ages, 30 throat swabs, 20 ear swabs, 18 urine samples and 7 vaginal swabs. All patients were subjected to blood sampling detection of Erythrocyte Sedimentation Rate (ESR) and Anti Streptolysin O (ASOT).

2. Preparation of samples

Samples of both raw milk and Kariesh cheese were prepared following the procedure described by APHA (1985). Both beef and chicken luncheon samples were prepared according to ICMSF (1996).

B-Kits

Bicon latex (Bicon Diagnosemitten GmbH & co) for ASOT slide test.

C- Chemicals

Sodium citrate solution 3.8%

Hydrogen peroxide 10%.

D-Sterile swabs

E- Media

blood agar and peptone water prepared according to Cruickshank *et al.* (1975).

METHODS

1- Isolation and Identification: (Cheesbrough Monica, 1993)

All samples Streaked directly into Sheep Blood agar for detection of different types of hemolytic *Streptococcus* species.

Morphological identification, cultural characters and catalase test were done for different isolates. Serological identification were done for serum samples obtained from all patients by applying ASOT slide test.

2- Erythrocyte Sedimentation Rate (ESR)

Diluted citrated blood (1 : 5) by using sodium citrate 3.8% was subjected for ESR and readings were obtained, after first and second hours for calculation of mean ESR.

RESULTS

Table 1. Incidence of hemolytic *Streptococci* in different food of animal origin.

Type of Sample	No.	Hemolytic <i>Streptococci</i>					
		Alpha	%	Beta	%	Gamma	%
Milk	64	8	12.5	12	18.7	8	12.5
Kariesh Cheese	10	0	0	3	30	0	0
Beef luncheon	20	6	30	3	15	0	0
Chicken luncheon	20	3	15	5	25	0	0
Total	114	17	14.9	23	20.1	8	7

Table 1 illustrates that Beta hemolytic *Streptococci* were frequently isolated from Kariesh cheese and milk samples of both apparently healthy cows and buffaloes followed by chicken luncheon and beef luncheon. Whereas alpha hemolytic *Streptococci* were isolated from beef luncheon followed by chicken luncheon and

milk samples. However, gamma hemolytic *Streptococci* were isolated from milk samples only.

Table 2. Incidence of hemolytic *Streptococci* in samples obtained from different infected sites of human patients.

Type of Sample	No.	Hemolytic Streptococci					
		Alpha	%	Beta	%	Gamma	%
Throat swabs (6 – 12 Years)	30	12	40	15	50	0	0
Ear swabs (6 – 12 Years)	20	11	55	1	5	4	20
Urine samples (Adults with Proteinuria)	18	0	0	2	11.1	0	0
Vaginal swabs (Females with vaginitis)	07	1	14.2	0	0	0	0
Total	75	24	32	18	24	4	5.34

Table 2 shows that Beta hemolytic *Streptococci* were isolated from throat swabs of children aged between 6 – 12 years suffering from tonsillitis, followed by urine samples, while, alpha hemolytic *Streptococci* were isolated from throat swabs of children suffering from tonsillitis, ear swabs of children suffering from otitis media, and vaginal swabs of females suffering from vaginitis. Meanwhile, gamma hemolytic *Streptococci* were isolated only from ear swabs of children suffering from otitis media.

Table 3. Total incidence of positively reacting Antistreptolysin O (ASOT).

Number of samples	Number of samples were ASOT positive	Percentage%
75	28	37.3%

Patients who were subjected to ASOT revealed high incidence of positively reacting serum. It is of importance to indicate that positively reacting individuals had high mean ESR on average of 38 mm.

DISCUSSION

The isolation of *Streptococci* isolated from animal products at high incidence indicated the presence of potential risk of infection for the consumers. Alpha, *beta* and *gamma hemolytic Streptococci* were isolated from milk of apparently healthy cows and buffaloes, where, *beta hemolytic Streptococci* were the most frequently isolated (18.7%) followed by *alpha hemolytic Streptococci* (12.5%). Meanwhile, *beta hemolytic* type was the only type of hemolytic *Streptococci* isolated in Kariesh cheese (30%) as shown in Table 1. These results were in agreement with those obtained by Mazura (1989) who found that beta hemolytic *Streptococcus agalactiae* mostly was the causative agent of mastitis in the examined cows (6.4%) followed by beta hemolytic *Streptococcus dysgalactiae* (3.7%). Mazura (1989) added that other beta hemolytic *Streptococci* of groups C, G and L were demonstrated in milk (0.3%) and the remaining species of streptococci were identified in 1% of cows. Whereas, Bar-Dayana *et al.* (1996) added that group A beta hemolytic *streptococcus spp.* were isolated from processed white cheese that had been prepared without using a proper hand washing technique by workers whose throat culture were positive for *Streptococcus spp.*

Consumption of beef luncheon and Chicken luncheon may constitute a potential risk as they had been found to be contaminated with beta hemolytic *Streptococci* at a ratio ranged from 15 to 25%, respectively. The incidence of alpha

hemolytic *Streptococci* ranged from 30 to 15%, respectively. Such results confirm the data reported by Decker *et al.* (1985). Ulutan *et al.* (1989) added that group A beta hemolytic *Streptococci* were isolated from throat swabs of persons with pharyngitis in percentage (63.8%) following consumption of luncheon, with high level of ASOT titers (81.2%). The results obtained during this study revealed that 50% of throat swabs were positive for beta hemolytic *Streptococci*, while 40% of them were positive for alpha hemolytic *Streptococci*.

In this regard, Farley *et al.* (1993) found that 88% of tested children, following consumption of cheese as an elementary school banquet were developing pharyngitis with an evidence of group A beta hemolytic *Streptococci* in their throat, assuring that beta hemolytic *Streptococci* were the most causative agent for tonsillitis. Moreover, Fujiyoshi *et al.* (2001) indicated that alpha hemolytic *Streptococcus milleri* was isolated in percentage of 25.8% from peritonsillar abscess. Ear swabs from children suffering from otitis media indicted that they mostly had alpha hemolytic *Streptococci*, followed by gamma hemolytic *streptococci* then, beta hemolytic *streptococci* in percentage of 55%, 20% and 1%, respectively. Bunse *et al.* (1987) found that coagulase negative *staphylococci* were the most frequently isolates from middle ear effusion and were followed in incidence by alpha hemolytic *streptococci* and group D *streptococci*. Lacosta *et al.* (1995) added that beta hemolytic *streptococci* group A was isolated also from nasopharyngeal cultures of children suffering from secretory otitis media.

During this study, 2 isolates of beta hemolytic *streptococci* (22.2%) were isolated from urine samples of patients, suffering from pyelonephritis and proteinuria in addition to one alpha hemolytic *streptococci* (14.2%) which were isolated also from adult females suffering from vaginitis.

Sakaki *et al.* (1991) reported on hemolytic *streptococci* of groups A, B, C and G from different clinical specimens and added that these *streptococci* mostly of group A and group B were found mainly in throat swabs greater than in urine samples .

Serologically, 28 children were positive for ASOT in percentage of 37.3% that having high mean ESR on average about 38 mm denoting risk of rheumatic fever.

Such finding confirms the data given by Rajkumar and Krishnamurtly (2001) who found children suffering from repeated sore throat and had high incidence of positive beta hemolytic *streptococci* group A, high titers for ASOT, high ESR and positive C-reactive protein that means a high risk of rheumatic fever.

In conclusion, the results of this investigation revealed, that the examined animal products proved to be contaminated with hemolytic *streptococci* of different types, which constitute a possible public health hazards, and therefore, monitoring of hemolytic *streptococci* in different animal products in Kafr El-Sheikh Governorate should be done for controlling hazards of rheumatic fever, otitis and pyelonephritis in human being.

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ACKNOWLEDGEMENT

We are very grateful to Dr. Abd-Allah El-Naggar, Specialist of Internal Medicine at El-Obour hospital and Dr. Mohammed Ramadan Azab Gynecologist in Kafr el-Sheikh public hospital for their continuous help in obtaining samples from hospitals and clinics.

دور البكتيريا السبحية المعزولة من بعض الأطعمة ذات الأصل الحيوانى على الصحة العامة

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تم عزل بعض العترات من البكتيريا السبحية من الأغذية ذات الأصول الحيوانية وكذلك من بؤرات مختلفة داخل جسم الإنسان لذا تم أخذ ٦٤ عينة لبن من ضروع الأبقار والجاموس السليمة ظاهرياً وكذلك ١٠ عينات من الجبنة القريش وعشرين عينة لانشون بقرى وعشرين عينة لانشون دجاج من مناطق مختلفة بمحافظة كفر الشيخ وتمت زراعتها مباشرة على مستنبت الدم وذلك لعزل الأنواع المختلفة (الفا وبيتا وجاما) من البكتيريا السبحية وكذلك تم زرع ثلاثين عينة من حلق أطفال يعانون من إلتهاب الحلق على نفس المستنبت وكذلك عشرين مسحة من الأذن لأطفال يعانون من إلتهاب فى الأذن الوسطى مع العلم بأن متوسط أعمار هؤلاء الأطفال يتراوح بين ٦ - ١٢ سنة وهم يتواجدون بمستشفى كفر الشيخ وقد كانت متوسطات سرعة الترسيب ٣٨ ملليمتر.

تم أخذ عينات من العيادات الخارجية منها ١٨ عينة بول لمرضى كلى ويحتوى البول على نسبة زلال عالية وكذلك سبعة مسحات مهبئية من سيدات بهن إصابة بالتهاب مهبلى وتم زرعها على نفس المستنبت.

وقد تبين بالفحص السيرولوحي أن نسبة المرضى الإيجابيين لإختبار الأنتى ستربتوليسين هى ٣٧,٤%. أكدت الدراسة أن أنواع العترات المعزولة من البكتيريا السبحية من الأطعمة ذات الأصل الحيوانى هى نفسها المعزولة من البؤرات المختلفة لجسم الإنسان.