

INCIDENCE OF *STREPTOBACILLUS MONILIFORMIS* IN LABORATORY RATS AND MICE

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(Received 18 May 2005,Accepted 30 March 2006)

Keywords:Streptobacillus,Rat bite fever,Pathogenicity.

ABSTRACT

Conjunctiva of thirty rats and ten mice were examined for the presence of the normal flora *Streptobacillus moniliformis* which is the causative agent of rat-bite fever in man . 60 % of each rats and mice were found to harbor this bacteria suggesting a potential source for human infection . biochemical characterization revealed occurrence of biotypes which are valuable in tracing epidemics . A test for pathogenicity was carried out on rabbit .

INTRODUCTION

Streptobacillus moniliformis is a normal resident of the oropharynx and conjunctiva of wild or laboratory rats , mice and other rodents (1,2) . it is a nutritionally fastidious Gram negative zoonotic bacteria that is potentially pathogenic for human and some laboratory animals . It is usually transmitted to human via biting or blood (3,4) . Infections have also occurred in persons working or living in rat infested building without reference to direct animal contact (5,6) . the disease produced in human has been known as Haverhill fever (7) . when it is not associated with a rodent bite and rat-bite fever (RBF) when associated with a rodent bite (8,9) . RBF is an acute febrile prostrating illness with significant mortality (up to 10 % when untreated) . Approximately one ~ half of patients develop a non supportive polyarthritis which is a hall mark of this disease (10) .

The incidence of *S. moniliformis* in rats and mice and it's medical significance is still unexplored in our country . Therefore , as a first step , the aim of the present study is to determine the extent to which *S.moniliformis* is an indigenous in laboratory rats and mice .

MATERIAL AND METHODS

Thirty rats and ten mice (Albino – Balb) in the Biology Department animal house – college of science , not under any experimental research were examined . culture specimens were obtained by wiping the conjunctiva with a sterile moistened cotton – tipped applicator dipped in sterile brain heart infusion broth . specimens were immediately streaked onto blood agar base (Oxoid) supplemented by 20 % sheep blood and incubated aerobically at 37°C . All colony types from primary cultures grown after 24-72 hrs . were Gram stained and characterized for catalase , oxidase and oxidation – fermentation activities . Small , round , gray and translucent colonies which give rise to Gram negative , highly pleomorphic rods occurring in chains or long filaments and were negative for catalase and oxidase (2,11) , were further characterized for their ability to produce acid from glucose and fructose and for gelatin and starch hydrolysis .

Test for pathogenicity

Rats harboring *S.moniliformis* were allowed to share normal , healthy , non experimental rabbits in their cages and were examined daily . Diagnosis was made by slide agglutination test (12) .

RESULTS AND DISCUSSION

Table (1) illustrates percentage recovery of various bacterial group in conjunctiva of laboratory rats and mice . Bacterial groups have shown almost the same patterns of recovery ; 70 % were Gram negative cocci comprising the genera : Staphylococci , Streptococci and Diplococci . The second major group (60 %) was *Streptobacillus moniliformis* the only species of the genus (5,3) . The least recovery was for both *Neisseria* and *Pseudomonas* (10 % each) . However , yeasts were only recovered in mice (20 %) .

Although *S.moniliformis* is a normal flora but their percentage recovery in our laboratory rats and mice is rather higher than that recovered in Japan (14) and U.S.A. (12,15) suggesting a potential source for human infection (10) . Informations concerning incidence , geographic and racial data are not readily available , yet further research studies are required . When *S.moniliformis* isolates were further characterized for a number of tests (5) , variability amongst isolates was detected : all isolates from both type laboratory animals were able to produce acid but not gas from glucose and fructose which agreed with the finding of Edward and Finch (16) contrary to the report of Cohen and Whittler (17) . 15 % and approximately 70 % of the isolates from rats and mice respectively were able to hydrolyze gelatin and only 10 % of rats isolates and non from mice isolates were able to hydrolyze starch which disagree with Slotnick (5) who reported that *S.moniliformis* is able to hydrolyze starch but not gelatin . These variabilities

amongst isolates of the same batch of mice and rats are interesting and might indicate emergence of various biotypes or the lack of stability of these characteristics (16) . However , further characterization tests should be conducted to evaluate these results .

Test of pathogenicity

Healthy animal carriers of *S.moniliformis* do not play any apperent role in the transmission of the disease among themselves (18) . However , When these animal carriers were left in rabbit cages , a deep red indurated lesions were abserved at thighs (the bite site) of 10 out of 14 rabbits after 3 days from being left with animal carrier . Infected rabbits were unable to stand and remained recombent although they continued to eat and drink sparingly . Serum of the bitten rabbits was checked for the presence of *S.moniliformis* by slide agglutination test (12) . All the infected rabbits have demonstrated the *Streptobacillus* agglutinins in high titer . In addition , *S.moniliformis* was successfully isolated by routin blood culture (1,19) . Few days later , regional lymph nodes swell were observed which become tender and painful . A measle like rash were eventually covered all the body and the ten rabbits died within 10 days .

A comparable result was reported by Savage *et. al.* (18) who inoculated 10 mice with 105 organisms intravenously , and eight died within 14 days .

Although rat – bite fever is not a reportable disease but reporters from Canada (15) have described nine cases of *Streptobacillus* Rat Bite Fever (SRBF) in technicians and physicians after bites by laboratory rats . Furthermore , three cases have been traced to bites by laboratory rats in a single institution within a six month period (10) making this disease an important consideration in febrile illness among laboratory workers .

Table 1 : Incidence of bacterial groups recovered from the conjunctiva of laboratory rats and mice

Bacterial Group	Rats		Mice	
	n (30)	% recovery	n (10)	% recovery
Gram positive cocci (Staphylococci , Streptococci , Diplococci)	21	70	7	70
Gram positive Diphtheroides	2	7	-	-
<i>Streptobacillus moniliformis</i>	20	60	6	60
<i>Neisseria</i>	3	10	1	10
<i>Pseudomonase</i>	3	10	-	-
Gram positive Bacilli	12	40	-	-
Yeasts	-	-	2	20

ACKNOWLEDGMENT

The author wishes to thank Mr . Abdul Ilah , S. and Mr . Yassin , Y. for their technical assistance .

تردد الجرثومة *Streptobacillus moniliformis* في الجرذان والفئران المختبرية

هديل توفيق الحديثي

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الخلاصة

فحصت عينات من ملتحمة ثلاثون جرذاً وعشرة فئران مختبرية لدراسة وجود جرثومة *Streptobacillus moniliformis* الموجوده طبيعياً فيهما ولكنها تسبب مرض حمى عضة الجرذ عند الانسان . وجد ان ٦٠ % من كلا الجرذان والفئران حامله لهذه الجرثومة مما يؤكد ان هذه الحيوانات المختبرية تعتبر مصدراً محتملاً لنقل المرض للانسان . وعند اجراء عددا من الفحوصات الكيموحيوية امكن الكشف عن وجود انماط حيويه ولذلك اهميته البالغه في تتبع الحالات الوبائيه . اجري اختبار الامراضيه على الارانب .

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