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## Bacteriological Studies on the Uteri of Slaughtered Goats

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**Abstract:** Eleven different bacterial species were recognized from the uteri of goats. The species were: *Micrococcus citreus, Staphylococcus epidermidis, Staphylococcus intermedius, Staphylococcus aureus, Proteus mirabilis, Escherichia coli, Corynebacterium pyogenes, Pseudomonas aeroginasa, Listeria monocytogenes, Klebsiella aerogenes and Pasteurella multocida.* 

Of the 100 uteri, only 80 (80%) were found positive contained bacterial organisms while 20 (20%) were negative. Thus prevalence of bacterial organisms in the uteri was recorded as 80%.

The percentage incidence of individual bacterial species in the uteri of goats was also carried-out. The bacterial species were: *Micrococcus citreus* (26.25%), *Staphylococcus epidermidis* (17.5%), *Staphylococcus intermedius* (16.25%), *Staphylococcus aureus* (15%), *Proteus mirabilis* (15%), *Escherichia coli* (13.75%), *Corynebacterium pyogenes* (6.3%), *Pseudomonas aeroginosa* (5%), *Listeria monocytogenes* (3.75%), *Klebsiella aerogenes* (3.7%) and *Pasteurella multocida* (2.5%).

During present study, an investigation was also made to determine the uterine infections in goats. From 100 uteri examined, 80 were contaminated with different bacterial species. From these uteri, 7 (8.75%) contained pus fluid. All pyometric uteri, 2 of them produced pure infection while 5 contained mixed infections. The species *Staphylococcus aureus* was detected as a pure infection and 4 different species recognized from 5 uteri contained pus material. The species identified were: *Staphylococcus aureus*, *Staphylococcus intermedius*, *Staphylococcus epidermidis* and *Micrococcus citreus*. The observations on mixed infections, 80 uteri were examined and the incidence of mixed infections recorded as 20%. Of the 100 uteri of goats examined, 20 were found organisms free while pure infections were found in only 64. However, mixed infections with 2-4 species were also recorded in individual uteri. In a single uterus, 4 different species were also detected.

Key words: Slaughtered goats, Uteri, Bacterial organisms

### Introduction

Since goat plays an important role in the economy of Pakistan there is a lack of information about the genital diseases of goats. Diseases are regarded as one of the major constraint which limited the goat production and reproductive diseases are known to be an essential and major component of this limitation.

Reproductive disorders causing perinatal kid losses due to occasional uterine infections as a result of pyogenic bacteria, early embryonic loss because of *Vibrio fetus, Chlamydial* infection, late abortions associated with *Brucella melitensis, Mycoplasma* infection and still births (Bhattacharya, 1982).

Uterus is a part of reproductive tract where zygote grows after fertilization and gets it nourishment during whole period of pregnancy. The uteri of animals always remain free from bacterial infection only due to cervical mucous seal. But on two occasions, uteri get contaminated, one during estrus and other at parturition. On these two occasions, micro-organisms get entry into uterus and cause infection.

There are large number of reproductive diseases which can effect production and as well as health of goats. The diseases are brucellosis, vibriosis, listeriosis and other uterine infections which are caused by variety of microorganisms which need some attention towards treatment and control. For this purpose, the present study was therefore, planned to identify bacterial species along with their prevalence and incidence those cause uterine infection in goats.

#### **Materials and Methods**

One hundred uteri of slaughtered goats were collected during 1999 from different slaughter houses of Hyderabad city for isolation and identification of bacteria present in the uteri of goats.

All uteri were collected in the sterilized polythene bags with the help of sterile scissor, forceps and kept into ice box immediately after collection and brought to the Department of Microbiology, Faculty of Animal Husbandry and Veterinary Sciences, Sindh, Agriculture University, Tando Jam for isolation and identification of bacteria) species. Before processing the uteri samples, used glassware such as Petri dishes, pipettes and flasks etc were kept in 1% HCL solution overnight and washed well with distilled water for several times then dried in oven at 65°C. After that, the sterilization was carried-out in hot air oven at 180°C for one and half hour.

The bacterial culture media were prepared and used for detailed investigation of bacterial organisms (Difco Laboratories, 1962). Both, solid and broth media were used. In solid media: nutrient, blood and MacConkey's agars and while in broth medium: nutrient broth was prepared, cultured and colony characteristics were recognized.

A pure colony from cultured dishes was picked-up and smeared on a cleaned glass slide and stained by Gram's method of staining and staining characteristics of individual species were recorded.

A few biochemical tests were also conducted so as to confirm their chemical properties. For this purpose, the tests carried-out were: coagulase, oxidase, indole, Voges Proskauer, urease, methyl red, gelatin liquefaction, Simmon's citrate,  $H_2S$  production, catalase and TSI (Cruickshank, 1970).

For sugar fermentation characteristics, eight different sugars of 1% were prepared in peptone water and used for each isolated bacterial species as described by Cruickshank (1970). The sugars were sucrose, glucose, lactose, mannitol, maltose, inositol, arabinose and raffinose.

#### **Results and Discussion**

The data regarding the prevalence of bacterial organisms in the uteri of goats are summarized in Table 1. A total of 100 uteri were examined, only 80 were found positive contained bacterial organisms while 20 were negative. It seems to be that the uterus is the part of reproductive tract which get contaminated on two occasions, one at the time of estrus and second during parturition. Otherwise it remains free from bacterial contamination because of mucus seal. It is observed that risk of infection and other reproductive disorders could be caused by these bacterial organisms.

Table 1: The number and percentage of the uteri of goats contaminated with bacterial organisms

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Total No.	No. of		No. of	
of uteri	positive	(%)	negative	(%)
examined	uteri		uteri	
100	80	(80)	20	(20)

 

 Table 2:
 The percentage incidence of each bacterial species in the uteri of goats during examination period (80, positive uteri)

Bacterial	No. of uteri	%
Species	occurring in	
Micrococcus citreus	21	26.25
Staphylococcus epidermidis	14	17.50
Staphylococcus intermedius	13	16.25
Staphylococcus aureus	12	15.00
Proteus mirabilis	12	15.00
Escherichia coil	11	13.75
Corynebacterium pyogenes	5	6.30
Pseudomonas aeroginosa	4	5.00
Listeria monocytogenes	3	3.75
Kiebsiella aerogenes	3	3.70
Pasteurella multocida	2	2.50

The prevalence percentage of bacterial species recorded in the uteri of goats in present study is very close to the percentage prevalence of microflora from the uteri of sheep recorded by Moorthy and Singh (1982). They examined bacterial flora of the anterior vagina and cervix of 86 live sheep and a dead g oat in India, noted 82 (95.3%) out of 86 uteri contained bacterial organisms. In another study, Moorthy and Singh (1972) recorded somewhat lower prevalence (44.60%) of bacterial organisms in the uteri of goats as compared to the present investigation. Lower prevalence of bacterial flora in the uteri of goats was also reported by De Lord *et al.* (1989), Sanar *et al.* (1988) and Abdel-Ghani *et al.* (1984). They recorded as 14, 7.43 and 0.93% prevalence in the uteri of goats respectively. Whereas, Gamcik *et al.* (1975) isolated bacteria from 25 (27.7%) out of 90 ewes' uteri slaughtered at an abattoir.

During this survey, eleven different species were recognized and number and percentage incidence of each bacterial species was also observed and tabulated in Table 2 and Fig. 1. The species identified from the uteri of goats were: Micrococcus citreus (21), Staphylococcus epidermidis (14), Staphylococcus intermedius (13), Staphylococcus aureus (12), Proteus mirabilis (12), Escherichia coli (11), Corynebacterium pyogenes (5), Pseudomonas aeroginosa (4), Listeria monocytogenes (3), Klebsiella aerogenes (3) and Pasteurella multocida (2). The higher incidence of bacterial species observed in the uteri of goats was Micrococcus citreus and its presence was recorded 26.25%. The next higher incidence of bacterial species in the uteri of goats was occurred by Staphylococcus epidermidis and Staphylococcus intermedius and their incidences noted as 17.5 and 16.25% respectively. Whereas the bacterial species with lowest incidence were Listeria monocytogenes, Klebsiella aerogenes and Pasteurella multocida and their percentages were noted as 3.75, 3.7 and 2.5 respectively. The number and incidence percentage of other species are also presented in Table 2 and Fig. 1. From this study, it is concluded that most of the organisms, both pathogenic and non-pathogenic were present in the uteri without causing any appreciable change in the uteri. During this investigation, we did find a few uteri which contained pus. This pus formation was observed in those uteri which were infected mainly with Staphylococcus aureus and Staphylococcus interrnedius. It is further concluded that pathogenic organisms can cause reproductive diseases which could establish permanent or temporary infertility in animals.

The bacterial species identified from the uteri of goats during present investigation are the same as recognized by Moorthy and Singh (1972), Malik et al. (1987) and Gamcik et al. (1975) during their study on the microflora of the uteri of goats. Moorthy and Singh (1982) isolated bacterial species from different parts of reproductive tract. The species identified were Staphylococcus aureus, Corynebacterium pyogenes, Listeria monocytogenes, Pseudomonas aeroginosa, Micrococcus and Escherichia coli. The tendency of incidence of identified species recorded arid mentioned earlier in this study is similar to that of Moorthy and Singh (1982) who recorded as 23.2, 4.2, 1.0, 3.2 24.2 and 43.3% respectively. At the same time they also identified other microorganisms from the uteri of sheep and goat which were not seen during this survey. During examination period, we also found same other organisms from the uteri of goats that were not observed by the above workers. In another study, Moorthy and Singh (1972) recognized Staphylococcus epidertnidis from uteri of goats was also isolated in the present investigation. Gamcik et al. (1975), Malik et al. (1987)

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Total No. of	No. of pyometric	%	No. of pyometric	Name of sp.	No. of pyometric	Name of spp.
positive uteri	uteri		uteri with pure sp.		uteri mixed app.	
80	7	8.75	2	Staph. aureus	5	Staph. aureus, Staph. epidermidis, Staph. intermedius, Microc. citreus.

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The number of spec The number of uteri	0 20	1 64	2 10 12 5	3 5 6 25	4 1 1 25	
Table 5: The numbe	er and percentage of combi	ned bacterial s	pecies in the	uteri of goats	0.25	1.25
Total No. of uteri contained bacteria	No. of uteri with pu species	re (%	6)	No.of uteri wit species	th mixed	(%)
80	64	18	30.01	16		(20.0)
30						
25 -						
20 <b>-</b>						
in uteri of goat						
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· · · · ·	Mic.cit St.epi St.in	t St.aur Prot	.mir E.coli	Cory.pyo Ps.aero	L.mono KLasro	Pat.mul

Table 4: The number of bacterial species present in individual uteri

Fig. 1: The % incidence f individual bacterial species in the uteri of goats

and Sanar *et al.* (1988) carried-out an investigation on the bacterial flora of uteri of goat, sheep and cattle. They recognized *Pseudomonas aerginosa, Staphylococcus aureus, Escherichia coli, Corynebacterium pyogenes, Klebsiella* and *Proteus* species from reproductive organs of the above animals.

Furthermore, we also found few uteri which contained pus mixed with uterine fluid. On examination, a few uteri were seen with pure and mixed organisms.

The uteri with pure species contained pus and showed the presence of Staphylococcus aureus and epidermidis while other uteri were not demonstrated properly as which species is responsible for causing pus in the uteri. Generally, all the species recorded in this investigation are considered to be pus producing but we found somewhat different in that though species were present but did not show the presence of pus or any obvious change in the uteri. Fasanya et al. (1987) carried-out an examination on pre-breeding vaginal swabs. Species Staphylococcus, Streptococcus and Micrococcus were isolated from 20, 15 and 4 goats respectively. They further mentioned in their study that post-partum vagina did not show any change in the microbial flora. On days 2, 12 and 16 to 24 post-partum examination, again the same organisms were recorded. They concluded that these organisms can live for long period in the uterus of animals without causing any

#### disease.

Bacterial species are different in their nature, some cause hemolysis of red blood cells and others destroy body cells and produce pus fluid during their course of infection. From these, seven uteri contained pus fluid (Table 3). All seven pyometric uteri, two were produced by pure infection and other 5 were of mixed infections. The species Staphylococcus aureus was separated as a pure infection while 4 different species were recognized from 5 uteri that contained pus material. The species identified were Staphylococcus aureus, Staphylococcus intermedius, Staphylococcus epidermidis and Micrococcus citreus. In scientific literature, Micrococcus citreus was considered to be non-pathogenic and non-pus producing organism, but in present survey, the uteri of goats contained pus. This condition may be caused by other species and not by Micrococcus citreus as mentioned earlier. It will therefore be necessary to study the actual nature of this species by some experimental work to know the nature of organism whether it causes pus or not.

However, it is concluded from the present study that not all but a few organisms can cause infection and also produce pus in the organ which again depends upon the nature of the species with their specific cells, organs and hosts.

The findings regarding the pyometric condition of the uteri of goats and its percentage occurrence caused by various

species of bacteria identified during this survey are in partial agreement to those of Sanar et al. (1988) who examined 4186 fallopian tubes of goats slaughtered at Faisalabad abattoir (Table 4). From these fallopian tubes, 81 out of 126 yielded bacterial organisms. A total of 81 which were contaminated with organisms, 23 showed pyosalpinx and 2 with abscess. During this survey, we recorded only 7 uteri that contained pus and yielded Staphylococcus species, similar species were also recorded from pyosalpinx and abscess of fallopian tubes by the above workers. The number and percentage incidence of the species present in individual uteri of goats are presented in Table 4. Of the 100 uteri examined, 20 were found to be organisms free while pure infection's were found in only 64. However, mixed infections of 2-4 species were recorded in individual uteri. Whereas in a single uterus, 4 different species were detected. The present investigation reveals that mixed infections were common in uteri of goats.

The number of bacterial species detected in any single uterus ranged from 2-4 in the present survey which agrees to the observations of Tadayon et al. (1980) and Talan et al. (1989) who detected 2-4 different species in a single wound sample. Malik et al. (1987) studied 395 mucus samples from infertile cattle and recorded mixed infection, but they did not count the number of species present in a single sample. However, the uteri of goats examined in our study contained 1, 2, 3 and 4 species. A similar trend was encountered by Tadayon et al. (1980) who recorded 29.06% mixed infections that contained 2-4 different species. Whereas Malik et al. (1987) detected about 64% mixed infections from uterine mucus samples of infertile cattle. They further stated that mixed species are common in the uterine infection. The values about the number and percentage of combined bacterial infection in the uteri of goats are given in Table 5. During this work, 80 uteri were found positive with bacterial contamination. From these, sixty four were found with pure infection while 16 were detected as mixed infections. It is therefore concluded from the present study that mixed infections are common in the uteri of goats.

The findings regarding combined bacterial infections in the uteri of goats encountered in this survey are in accordance to the values given by Malik *et al.* (1987) who examined 395 mucus samples from cattle and reported mixed infections in the uteri as 57.5% while pure infection as 36.2%. However, they did not mention the remaining percentage of infection whether those were fungal or bacterial.

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