Prevalence and Incidence of *Staphylococcus aureus* from Wound of Different Animal Species

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Abstract: The prevalence incidence and biochemical characteristics of *Staphylococcus aureus* isolated from wounds of buffalos, goats, dogs, donkeys and chickens were studied during present indigestion.The highest infection of *Staphylococcus aureus* was found in wound samples of buffalos (70.00%). as compared to goat, (33%), dog, (3%) donkey (40%) and chicken, (46.66%) respectively. The overall pure samples with *Staphylococcus auerus* from the animals was recorded as 39.13% while mixed infection was observed as 34.78%. The shape of *Staphylococcus auerus* isolated from buffalos, goat, and chicken were cocci, spherical, round in shape and characterized as G+ve. The *Staphylococcus auerus* isolated from all the animals were non-motile. It is concluded that highest infections of *Staphylococcus aureus* was found in buffalo (70.00%), whereas highest number of *Staphylococcus aureus* bacterial specie was observed as compared to other bacterial species.

Keywords: Prevalence, Incidence, *Staphylococcus aureus,* wound, animal specie.

INTRODUCTION

*Staphylococcus aureus*is known as golden cluster seed or the seed gold or golden *Staph.* It is Gram positive cocci and commonly causes *Staph* infection. *Staphylococci* often represent a part of normal bacterial flora of the skin and mucosal surfaces of the respiratory, upper alimentary and urogenital tracts of mammals and birds. *Staphylococci* are easily spread between animals and under certain conditions to humans through contact with excretions such as saliva or aerosols released during sneezing and coughing. Moreover, *Staphylococci* spread by animal products, such as non-pasteurized milk [1]. *Staphylococcus aureus* causes problems like septicemia and skeletal infections in commercial broilers chicken [2]. The mechanism of spread of *Staphylococcus aureus* infection through poultry flocks is not fully understood [3]. A wound is a breach in the skin and the exposure of subcutaneous tissue following loss of skin integrity provides a moist, warm, and nutritive environment that is conducive to microbial colonization and proliferation [4]. Infection in a wound delays healing and may cause wound breakdown, herniation of the wound and complete wound dehiscence [5]. Keeping in view the above facts, the present study was therefore proposed to record the prevalence incidence of *Staphylococcus aureus* that causes infection in different animals.

MATERIAL AND METHODS

Samples of different natures were collected from various sources such as blood, k(completely wrapped/covered with aluminum foil) and was brought to the laboratory of the Department of Veterinary Microbiology, Faculty of Animal Husbandry and Veterinary Sciences, Sindh Agriculture University Tandojam and Central Veterinary Diagnostic Laboratory Tandojam for isolation of *Staphylococcus aureus* for biochemical bio typing. Before collection of samples, any hair or unwanted materials/ depositions on the place of sample collection were removed by scissors and antiseptics (depending on the nature of sample place or organs or tissues). The samples was collected in bottles and capped properly to avoid any further contamination. The specimen bottles containing samples was stored in the ice box containing ice.

After reaching in the laboratory the samples was kept in refrigerator at 4^0C for few hours. Then the samples were cultured on different culture media for the isolation and identification of *Siaphylococcal* species. The culture media was nutrient, blood, MacConkey's agars etc. The *Staphylococcus aureus* was culture in TSI and other broth media during investigation for the further confirmation of the species specific characteristics. The isolated *Staphylococcal*

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ISSN: 1814-8085 / E-ISSN: 1927-5129/18

aureus was tested in different chemicals and also sugar to record biochemical properties of the species.

RESULTS

In order to isolation and identifying of *Staphylococcus aureus* from wounds of different animals species, there wound samples were collected from animal and brought the Department of Veterinary Microbiology, Faculty of Animal Husbandry and Veterinary Sciences, Sindh Agriculture University Tandojam. The results are summarized in different tables.

The Number and Percentage of Wound Samples Infected with *Staphyloccocus aureus* in Different Animals

A total of wound samples were examined for *Staphylococcus aureus* infections in buffalos, goats, dogs, donkeys and chickens. The number and percentage of positive samples in buffalos, goats, dogs, donkeys, chickens were recorded as; 07 (70.00%), 04 (33.33%), 03 (37.50%), 02 (40.00%) and 07 (46.66%), respectively. The highest infections *of Staphylococcus aureus* was found in buffalo (70.00%). The Overall, 23 (40.00%) positive samples for *Staphylococcus aureus* infections were recorded in all animal species (Table **1**).

The Number and Percentage Incidence of *Staphylococcus aureus* from Wound Sample of Different Animals

A total of 23 wound samples from buffalos, goats, dogs, donkeys and chickens were examined found positive for *Staphylococcus aureus,* out of these 23 wound samples, 03 (42.85%), 01 (25.00%), 02 (28.75%), 01 (50.00%) and 02 (66.66%) samples found positive for presence of *Staphylococcus aureus*. Similarly out of 23 wound samples examined for *Staphylococcus aureus* and other bacterial species, 02 (28.57%), 02 (50.00%), 02 (28.57%), 01 (50.00%) and 01 (33.33%) were observed pure for presence of *Staphylococcus aureu s*and other bacterial species in buffalos, goats, dogs, donkeys and chickens, respectively. Moreover, out of 23 examined samples from wounds of buffalo's, goats, dogs, donkeys and chickens, 02 (28.57%), 02 (50.00%), 02 (28.57%), 01 (50.00%) and 01 (33.33%) were found positive for *Staphylococcus aureus* and other bacterial species. Overall 39.13% was found samples positive for *Staphylococcus aureus,* 34.78% samples found pure with *Staphylococcus aureus*and other bacterial spscies and their percentages were recorded as 34.72% in buffalos, goats, dogs, donkeys and chickens, respectively (Table **2**).

Morphological, Cultural and Staining Characteristics of *Staphylococcus aureus* Identified from Different Animal Species

During present investigation, *Staphylococcus auerus* was isolated and recognized form the samples such as injuries, cuts, surgical and non-surgical wounds of buffalos, goats, dogs, donkeys, chickens etc through their morphological, cultural and staining characteristics are presented in the form of Table **3**. However, individual animal species has been identified and their characteristics are described as under:

Buffalos

The bacterial species *Staphylococcus aureus* was recorded as Gram-positive, cocci, spherical, round in shape and possessed grape-like structure. The cells of this species were arranged in pairs, singles and irregular clusters. Cells were non-motile. Cultural characteristics on Nutrient AgaV, the species produced white to yellowish white and golden yellow colonies. It produced p-hemolysis of red blood cells on blood agar medium, whereas it did not grow on MacConkey's agar at all (Tables **3**).

Table 1: The Number and Percentage of Wound Samples Infected with *Staphyloccocus aureus* in Different Animals

Animal species	Total number of wound samples Examined	Number of positive samples with	Percentage of positive samples
Buffalos	10	07	70.00%
Goats	12	04	33.33%
Dogs	08	03	37.50%
Donkeys	05	02	40.00%
Chickens	15	07	46.66%
Total	50	23	46.00%

Table 2: The Number and Percentage Incidence of *Staphyloccocus aureus* from Found Samples of Different Animals

Animal species	Total number of positive samples with *Staphylococcus aureus*	Number of samples pure with *Staphylococcus aureus*	Percentage of samples pure with *Staphylococcus aureus*	Number of samples pure with *Staphylococcus aureus and* other bacterial species	Percentage of samples pure With *Staphylococcus aureus and* other bacterial species	Number of positive samples for other bacterial species	Percentage of positive samples for other bacterial species
Buffalo	07	03	42.85%	02	28.57%	02	28.57%
Goat	04	01	25.00%	02	50.00%	02	50.00%
Dog	07	02	28.57%	02	* 28.57%	02	28.57%
Donkey	02	01	50.00%	01	50.00%	01	50.00%
Chicken	03	02	66.66	01	33.33%	01	33.33%
Total	23	09	39.13%	08	34.78%	08	34.72%

Goats

The cells of *Staphylococcus aureus* were Gram-negative and appeared in the Shape of cocci of variable in size and with a few cluster, non-motile with peritrichous flagella. Mostly occurred singly but pairs were also seen under microscope. Cultural characteristics on Nutrient Agar, the species produced yellowish colonies. On blood agar medium, the species Produced p-hemolysis of red blood cells, while it did not grow on MacConkey's agar at all (Tables **3**).

Donkey

The cells of the bacterium appeared to be Gram-negative, coccie and clusters in shape under microscopic examination. The cells of the speicie were non-motile with the help ofpertitrichous and arranged singly, pairs or in short chains in fresh culture whereas long filamentous were common. On nutrient agar, pale yellowish, thick large wrinkled round colonies were observed. On blood agar medium, the species produced shiny, glistening with β-hemolysis of red blood cells, whereas on MacConey's agar the species were not growing at all (Tables **3**).

Chicken

Morphologically, *Staphylococcus aureus* was recorded as Gram-positive, cocci, motile and arranged tetrads or in cluster. Culturally, on Nutrient Agar, it produced white-creamy, circular smooth colonies. On blood agar medium, the species produced entire convex and did not show p-hemolytic colonies, whereas on MacConkey's agar the species were not growing at all (Tables **3**).

DISCUSSION

Staphylococcus aureus is bacterium which is commonly found in the skin and respiratory tract of human being. *S. aureus* has not been found always pathogenic species but some time it can caused skin, respiratory and food poising diseases. The diseases

Table 3: Morphological and Staining Characteristics of *Staphylococcus aureus* Recognized from Wound Samples of Different Animal Species

Animal species	Shape of bacterial cells	Arrangement of bacterial cells	Staining characteristics of bacterial cells	Motility
Buffalo	Cocci, spherical, round in shape	Grape like structure, pairs, singles and irregular clusters	G+ve	Non-motile
Goat	Cooci, cluster and pucked shaped	Mostly occurred singly, few were in pairs	G+ve	Non-Motile
Dog	Cooci	Occurred in singles, pairs or in short chains	G-ve	Non-Motile
Donkey	Cooci and clusters	Occurred single or in pairs	G-ve	Non-Motile
Chicken	Cocci	Occurred in tetrads or in cluster	G+ve	Non-motile

which are related to this strain mostly enhance the infection by secreting potent protein toxin and can produce protein on cell surface which may be inactive and bind antibodies [2]. The emergence of antibiotic-resistant forms of pathogenic *S. aureus* is a worldwide problem in clinical medicine. *Staphylococcus aureus* cause number of infections and also occurred as commensal but its present is not always responsible for infection [1]. *S. aureus* can survive from hours to weeks, or even months, on dry environmental surfaces, depending on strain. *S. aureus* infections can spread through contact with pus from an infected wound, skin-to-skin contact with an infected person by producing hyaluronidase that destroys tissues, and contact with objects such as `towels, sheets, clothing, or athletic equipment used by an infected person. Deeply penetrating *S. aureus* infections can be severe [6, 7]. The present study was conducted on the prevalence and biochemical characterization of *staphylococcus aureus* isolated from different animal species (Buffalos, Goats, Dogs, Donkeys and Chickens). The results of the study show that the number andpercentage of positive samples in buffalos, goats, dogs, donkeys, chickens were recorded as; 07 (70.00%), 04 (33.33%), 03 (37.50%), 02 (40.00%) and 07 (46.66%), respectively. The highest infections of *Staphylococcus aureus* was found in buffalo (70.00%). A total of 23 wound samples from buffalos, goats, dogs, donkeys and chickens were examined found positive for *Staphylococcus aureus,* out of these 23 wound samples, 03 (42.85%), 01 (25.00%), 02 (28.75%), 01 (50.00%) and 02 (66.66%) samples found positive for presence *of Staphylococcus aureus*. [8, 9] similarly out of 23 wound samples examined for *Staphylococcus aureus*02 (28.57%), 02 (50.00%), 02 (28.57%), 01 (50.00%) and 01 (33.33%) were pure for presence *of Staphylococcus aureus* and other bacterial species in buffalo, goat, dog, donkey and chicken, respectively. Moreover, out of 23 examined samples from wound of buffalos, goats, dogs, donkeys and chickens, 02 (28-57%), 02 (50.00%), 02 (28.57%), 01 (50.00%) and 01 (33.33%) found positive for *Staphylococcus aureus.* Overall 39.13% samples positive for *Staphylococcus aureus,* 34.78% samples found pure with *Staphylococcus aureus* and other bacterial species and their percentage were recorded as 34.72% in species in buffalos, goats, dogs, donkeys and chickens, respectively. [10-12] reported the shape of *Stsphylococcus auerus* isolated from buffalo was cocci, spherical, round in shape, G+ve; from chickens, the shape of *Staphylococcus auerus* was cocci, characterized as G+ve, and the shape of *Staphylococcus auerus* isolated from dogs was cocci, isolated from donkeys shape was cocci and clusters, characterized as G-ve, while the shape *of Staphylococcus auerus* isolated from goats was cocci which was characterized as G+ve. The *Staphylococcus auerus* species isolated from all the study animals were non-motile.

CONCLUSIONS

The highest infections of *Staphylococcus aureus* was found in buffalo (70.00%).

- The number and percentage of wound samples was found high under bacterial species *Staphylococcus aureus* as compared to other bacterial species.
- Overall 39.13% samples positive *fox Staphylococcus aureus*34.78% samples found pure with *Staphylococcus aureus* and other bacterial species and their percentage were recorded as 34.72% in species in buffalo, goat, dog, donkey and chicken, respectively.
- The shape of *Staphylococcus auerus* isolated from buffalo, goat, and chicken were Cocci, spherical, round in shape, characterized as G+ve; incase of donkey, the shape of *Staphylococcus auerus* was Cocci and clusters, characterized as G-ve.
- The *Staphylococcus auerus* isolated from all the animals were non-motile.

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Received on 27-10-2017 Accepted on 18-12-2017 Published on 02-02-2018

https://doi.org/10.6000/1927-5129.2018.14.03