Isolation and Identification of Some Types of Pathogenic Bacteria from the Prepuce (Foreskin) of Circumcised Children in Samarra City/Iraq

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Summary

From July 15th through August 15th, 2022, researchers from Samarra University's College of Education's Biology Department in Samarra City, Salah Al-Din Governorate, Iraq, will be conducting their studies. The aims of this research are to identify the bacteria responsible for the mucosal injury in the prepuce and to develop a method for isolating and identifying them. Fifty bacterial samples are taken using a sterile swab from prepuce for circumcised male children's penises at a few private clinics in the city of Samarra, representing children aged one month to five years. Only 5 out of 50 samples did not provide any bacterial growth, for a 90% success rate. Diagnosis and biochemical testing for microorganisms in circumcised children's bark wounds reveal that Staphylococcus epidermis is the most prevalent bacterial isolate at 43.2%, followed by Staphylococcus aureus at 31.5%, Pseudomonas aeruginosa at 14.3%, and Escherichia coli at 11.5%. Circumcised children's bark is used to make tissue sections, and although the age of the kid has no influence on the composition of the tissue, the presence of certain bacteria does. These bacteria include S. epidermis, P. aeruginosa, S. aureus, and E. coli. Degeneration of the stratified squamous epithelium layer in the inner portion of the prepuce, aggregation of inflammatory cells inside the dermis, congestion, bleeding, and epithelial layers were all seen upon histopathological analysis. Some sections showed necrosis hyperplasia of stratified squamous epithelium, with aggregation of necrosing ells surrounding look and infiltration of inflammatory cells between the squamous epithelial tissues. According to the findings, bacteria play a crucial role in initiating tissue lesions. Bacteria such as S. epidermidis, P. aeruginosa, and S. aureus are among the leading causes of infectious balanoposthitis. Balanoposthitis most often manifests between the ages of 1 month and 5 years old in children.

Keywords: foreskin: glans degeneration: cell impair fibriniod: fibrin agglutination Necrosis: cells destroyed erythrocytes (RBC): red blood cells

1. Introduction

The prepuce, also known as the foreskin, is the anatomical covering of the glans penis and an essential element of the male external genitalia. It is common to think of the prepuce as little more than skin, or at most a mere fold of skin and mucosa. [2]. Many people believe that the prepuce protects the glans penis, however circumcision can eliminate any potential health risks.

One of the most common medical procedures performed nowadays is circumcision. Most often, this is done for religious or cultural reasons, although it may also serve therapeutic purposes. The amount of skin removed during circumcision is minimal [4].

First of its kind anywhere, but especially relevant to the Islamic world, this research Both Gram-positive and Gram-negative bacteria produce wound sepsis, which may be fatal, since they thrive in the incision of the bark of circumcised male youngsters and can travel easily throughout the body. [5].

Like the frictional mucosa of the oral cavity, vagina, and esophagus, the prepuce is lined with squamous epithelium that is variably keratinized [6].

There is a lot of data available on how this illness progresses in people. Metal stenosis, urethral stricture, and even penile squamous cell cancer may result from the disease's progression. A necrotic skin or epithelial defect is seen in this wound [7]. Damaged blood vessels prevent the transmission of immune effector molecules such antibodies (antibodies) and immune cells, creating an environment conducive to microbial growth in the wound tissue. Infections spread rapidly from burns and wounds, accounting for a significant proportion of global mortality. Although burn wounds are initially sterile, non-sterilization, immune suppression, and burns affecting a vast surface area all increase the risk of colonization with skin-dwelling bacteria such S.epidermis, S.aureus, P.aeruginosa, and E.coli. [8]

The aim of study

The primary aim of this research is to identify the types of bacteria present on the mucosa of the prepuce in young children and to determine the function of these organisms.

2. Material and Method

1. sample collecting

The prepuces of 50 male children (mean age 1month

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- 5 years), after Circumcision of prepuce samples, by using a sterile swab to take smear from the inner side (mucosa) of prepuce and cultured on deferential media for diagnosis of bacteria

2. Diagnosis of Bacteria by Vitek

The bacteria to be diagnosed are streaked over Heart and Brain agar, and then 0.04 g salt is added before the plate is incubated at 37 m and for 24 hours. Isolates from the dish are chosen at random and subjected to a test for catalase production; this is done in accordance with standard procedures.

3. histological preparation

Histological slicing and dicing All of the tissue samples Each piece of skin is preserved by first soaking it in 10% formalin for 24 hours, then 70%, 80%, 90%, and 100% alcohol in ascending order, finally being cleared with xylene and embedded in paraffin wax at 60 C. The samples were blocked, then a rotary microtome is used to cut them into sections. The portions are 6 micrometers thick. After Hematoxylin and Eosin staining, the tissue slices were mounted with D.P.X and protected with cover slides [9]. The slides are analyzed using a light microscope, and photographs were taken with a special camera.

3. Results

Histo-slide micrographs are shown. The prepuce is lined by non-keratinized squamous epithelium, much as the frictional mucosa of the oral, vaginal, and esophageal mucosa. The dermis is underneath the epidermis and is made up of a network of fibroblasts, macrophages, and inflammatory ells embedded in fibrous, filamentous, and amorphous connective tissue.

Degeneration of the stratified squamous epithelium and infiltration of inflammatory cells under the dermis are seen upon microscopic inspection (fig 1). Congestion, hemorrhage, and inflammatory cell infiltration into the dermis underneath the epithelial cells layers are seen in (fig. cell death in the stratified squamous epithelium and clumping of dead cells outside the lumen (fig3). Fig. 4 shows a degradation of the keratin layer and stratified squamous epithelium, the formation of a fibriniod (black arrow), and the accumulation of RBCs in the external lumen. The loss of keratin-containing cells and the associated deterioration of the stratified squamous epithelium are seen in Fig. 5. Atrophy, as seen in Fig. 6, is accompanied by a reduction in the number of cells making up the stratified squamous Epithelium and the infiltration of inflammatory cells into the dermis.

Stratified squamous epithelium revealed necrosis and infiltration of inflammatory cells, whereas Fig. 7 showed keratin layer disintegration with accumulation of cell debris. Figure (8) displays inflammatory cell infiltration between the stratified squamous epithelium, the degeneration of the epithelium, and the collioed dermis underneath.

Histological analysis revealed keratin layer and stratified squamous epithelium necrosis, an accumulation of necrotic cells in the exterior lumen, infiltration of inflammatory cells, and degeneration of dermal connective fibers. Fig (9). Stratified squamous epithelium atrophy and infiltration of inflammatory cells into the dermis underneath the epithelium layer are seen in Fig (10).

Inflammatory cell infiltration was seen in the dermis between the epithelium and the dermis in this study's experimental group (Fig 11). Figure (12) displays dermal atrophy and infiltration with inflammatory cells beneath the epithelium.

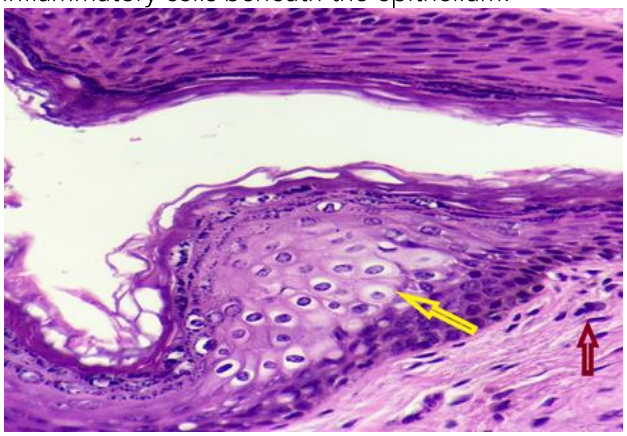

Fig (1) cross sections of foreskin shows degeneration in stratified squamous Epithelium (yellow arrow), and infiltration of inflammatory cells underneath dermis (brown arrow).

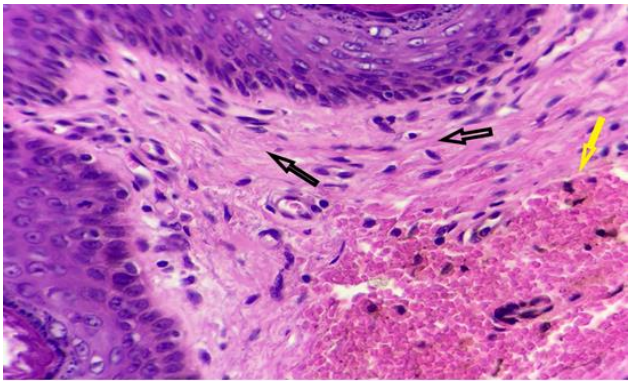

Fig (2) cross sections of foreskin shows congestion and bleeding (yellow arrow), and infiltration of inflammatory cells in dermis underneath epithelium cells layers (black arrow).

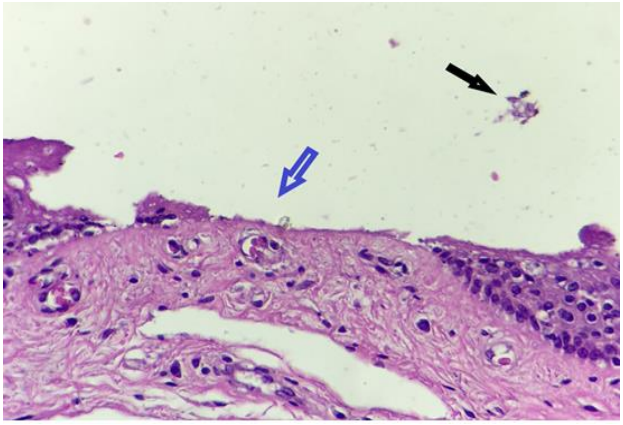

Fig (3) cross sections of foreskin shows necrosis of stratified squamous Epithelium (blue arrow), and aggregate of necrotic cells in the external lumen (black arrow).

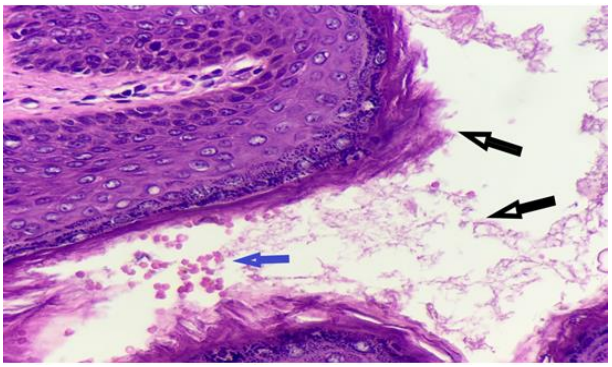

Fig (4) cross sections of foreskin shows degeneration of keratin layer and stratified squamous Epithelium and fibriniod appearance (black arrow), and aggregate of RBCs in the external lumen (blue arrow).

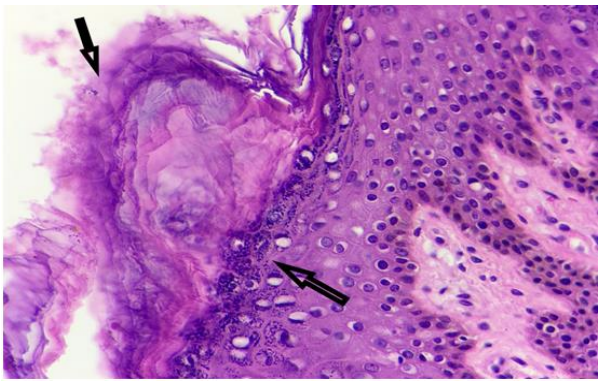

Fig (5) cross sections of foreskin shows degeneration in stratified squamous Epithelium and released cells content of keratin (black arrow).

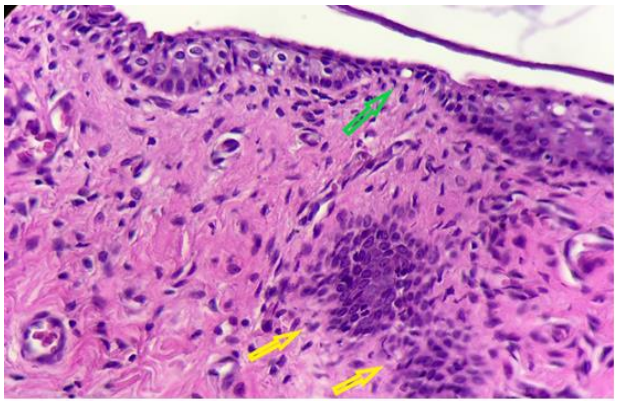

Fig (6) cross sections of foreskin shows atrophy with decrease in stratified squamous Epithelium cells layers (green arrow), and infiltration of inflammatory cells underneath dermis (yellow arrow).

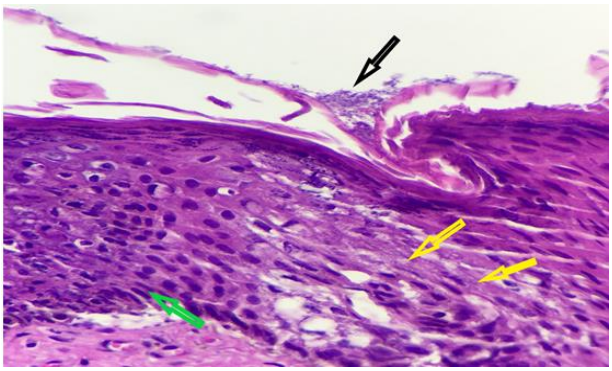

Fig (7) cross sections of foreskin shows fragmentations of keratin layer with aggregate of cell debris (black arrow), necrosis in stratified squamous Epithelium (yellow arrow), and infiltration of inflammatory cells in between stratified squamous Epithelium (green arrow).

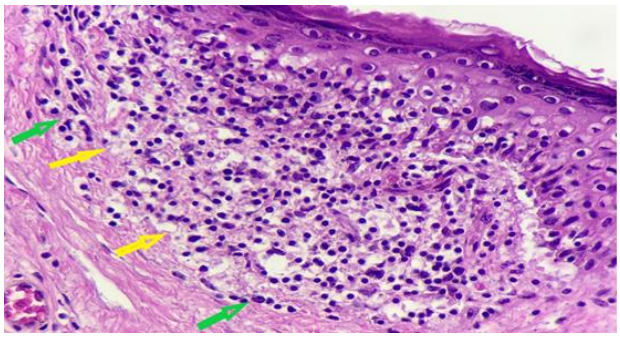

Fig (8) cross sections of foreskin shows infiltration of inflammatory cells in between stratified squamous Epithelium (green arrow), degeneration stratified squamous Epithelium and underneath dermis with collioed appearance (yellow arrow)

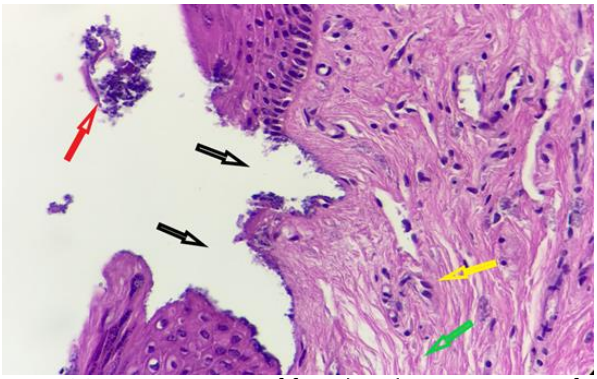

Fig (9) cross sections of foreskin shows necrosis of keratin layer ad stratified squamous Epithelium (black arrow), and aggregate of necrotic cells in the external lumen (red arrow), infiltration of inflammatory cells in between (yellow arrow), and degeneration dermis connective fibers (green arrow)

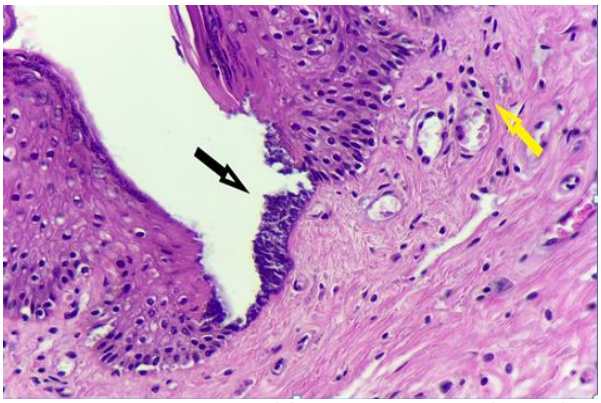

Fig (10) cross sections of foreskin atrophy of stratified squamous Epithelium (black arrow), and infiltration of inflammatory cells within dermis underneath epithelium (yellow arrow).

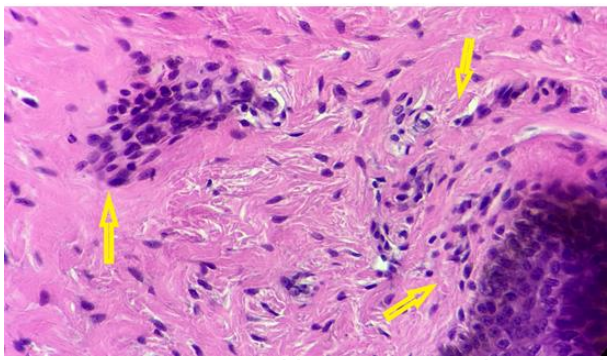

Fig (11) cross sections of foreskin shows infiltration of inflammatory cells within dermis underneath epithelium (yellow arrow).

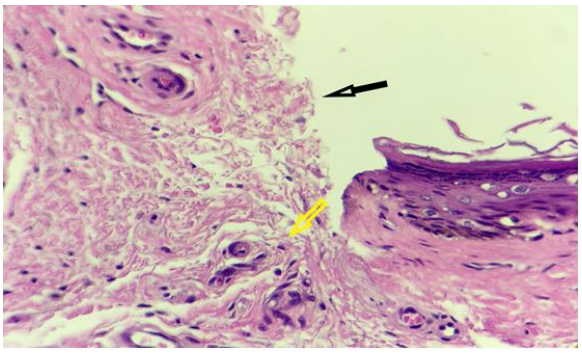

Fig (12) cross sections of foreskin shows atrophy of dermis (black arrow), and infiltration of inflammatory cells within dermis underneath epithelium (yellow arrow).

4. Discussion

This study's bacterial composition indicates that S. epidermidis (43.2%) is the most often isolated organism from surgical sites, followed by S. aureus (31.5%), P. aeruginosa (14.3%), and E. coli (3.7%). (11.5).

The incidence of infection at the incision site after circumcision ranges from 70% to 90%, depending on the diagnostic methods used, the patient population, and the use of antibiotic prophylaxis [10],[11]. There is congruence between the findings of this investigation and those of a prior study. In addition to being a common source of post-operative infections, S. epidermidis may be found in nature. Skin, hair, and mucous membranes all have their own normal flora [12]. Since S. epidermidis is the most common source of infection in a fracture operating room, the natural skin flora of patients or the surgical crew are often the contaminating sources. [13] Another research found that S. aureus, then P. aeruginosa, and finally E. coli, are the three most prevalent bacterial causes of SSI. Gram-negative bacteria predominate over their Gram-positive counterparts [14]. Because of its commensal nature in skin, Gram-positive S. aureus is often carried in the hands and noses of healthcare workers. P. aeruginosa is a very hardy and resistant bacteria that can thrive in harsh environments like hospital disinfectants. The gastrointestinal tract is a natural habitat for E. coli. Numerous studies have found that S. aureus is the most frequently isolated bacterium from infected circumcision wounds. [15] The inner surface of the prepuce is lined by stratified nonkeratinized sq. ep., which is attached with skin of body from outside and inside that covers glans of penis.

The current data on prepuce revealed deterioration in the stratified squamous epithelium.

Most males who suffer from balanoposthitis or balanitis (inflammation of the glans penis) are not circumcised [16].

Acute inflammation is present in the foreskins (prepuce) of most young boys because many of them had balanoposthitis, a dermatopathological lesion [17]. Our research confirmed the presence of inflammatory cell infiltration within the dermis, congestion and bleeding, necrosis of stratified squamous epithelium, and aggregate of necrotic cells, as well as the appearance of fibriniod and aggregate of RBCs in the external lumen.

In order to build up a mass of necrotic cells at a single point of focus. Physiological phimosis occurs at birth because of adhesions between the glans and the inner parts of prepuce. Debris, such dead skin cells, collects beneath the foreskin throughout the first three to four years of life. [18]

Balanitis Xerotica manifests as epidermal atrophy, accompanied by laminar swelling and fibrosis. Degeneration of the basal vacuolar layer and the presence of widespread inflammatory cells [19]. In agreement with the reported study's findings of dermal infiltration by inflammatory cells and atrophy of the stratified squamous epithelium.

Nonspecific urethritis (NSU) and balanitis have both been linked to anaerobes on the glans penis, especially in man who uncircumcised, so histological lesions may be caused by bacteria, as shown by research [20]. Infectious balanitis is most often caused by viruses, although bacteria, particularly Streptococcus spp., are a close second. Other, less frequent bacteria include Haemophilus parainfluenzae, Klebsiella spp., S. aureus, Enterococcus, Proteus, Morganella, and E. coli. [21].

Recognizing a typical pattern of inflammation is the first step in diagnosing a bacterial infection in tissue. [22]

Balanoposthitis is most frequent in children between the ages of 2 and 5[23], while bacterial infection may begin at any time after 1 or 2 months.

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