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SEPTIC ARTHRITIS IN DONKEYS

(With 2 Tables)

By

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التهاب المفاصل التقيحى فى الحمير

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بالفحص البكتيريولوجى للسائل الزلالى المفصلى لعدد ١٥ مفصل رسغ ، ١٠ مفصل معقم ، وواحد مفصل القيد فى الحمير أسفر عن عزل الميكروب المكور العنقودى بنسبه كبيره فى الالتهاب المفصلى التقيحى. الميكروب المكور العنقودى الذهبى يمثل (٢٨ر ١٤٪) والميكروب المكور العنقودى الإبيديرميدس (٩ر ٦١٪) كذلك تم عزل ميكروب الكورينى إكـواى والكورينى بيوجينز والإنتيروباكتر إيروجينز والشيجيلا. وتم عمل إختبار الحساسيه للعترات المعزولـه ووجد أن البكتريم هو المضاد الحيوى ذو أقوى فاعليه يليه الريفامبيسين والفلوموكين والكلورامفينيكول. ووجد أن كل العترات لم تستجب لإستعمال المضاد الحيوى البوليمكسين.

SUMMARY

Bacterial examination of the synovial effusion of 26 donkey joints (15 carpal, 10 fetlock and one pastern) revealed isolation of staph. sp as a prodominant microorganism in septic arthritis. *Staph aureus* represented (14.28%) and *Staph. epidermedis* was (61.9%). *Corynebacterium equi, Corynebacterium pyogenes, Enterobacter aerogenes* and Shigella sp. were also isolated. The antibiogram of the isolated microorganisms revealed that bactrim is the antibiotic of choice followed by rifampicin, flumequine and chloramphenicol. All strains showed resistance to polymyxin.

Keywords: *Arthritis Donkeys*

INTRODUCTION

Septic arthritis is the arthretic entity that results from sequestration of bacterial infection in a joint and the development of septic arthritis arises

mainly through three sources either haematogenous infections, traumatic injuries or iatrogenic infection *(STASHAK 1987)*. The haematogenous form may be associated with pneumonia, enteritis, umbilical or intrauterine infection or even any other form of systemic infections. Streptococcal sp., Actinobacillus sp. and *E. coli* are the most implicated organisms in the haematogenous form of septic arthritis *(MARTENS and AUER 1980)* while *Staphylococcous aureus and Corynebacterium equi* are also commonly isolated *(ROSE and LOVE 1979, STASHAK 1987 and LAPOINTE et al 1992)*. Traumatic form is usually associated with a direct injury but the joint capsule is intact, by time cellulitis and septic arthritis develops. In this case, Streptococcus sp. is the most common isolate but Staphylococcus sp. and *E.coli* are also frequently encountered. Iatrogenic septic arthritis generally follows joint aspiration, injection or arthrotomy and *Staphylococcus aureus* seems to be the prodominant organism *(MCI LWRAITH 1987)*.

Larger joints are more susceptible to haematogenous infection owing to their great area of highly vascular synovial membrane *(STASHAK 1987)*. *LAPOINTE et al (1992)* concluded that carpus and tarsus are the most susceptible joints for septic arthritis following intra-articular injection.

The prognosis for any case of infectious arthritis in horse is never good because of lack to response to treatment. Even with early and correct treatment, problems can still develop *(MCI LWRAITH 1987)*.

The present investigation aimed to deal with septic arthritis in donkeys as such study is meagre since most authors had fully investigated this problem among horses only.

MATERIAL and METHODS

I- Animals:

The present investigation was carried out on 26 donkeys of both sexes (1.5 - 5) years old. 13 of them were with unilateral carpal involved problems (painful swellings or bony exostosis) as well as 8 animals suffering from unilateral fetlock joint problems and a single case of affected pastern joint. Four apparently healthy donkeys with normal joints were choosen as control animals, 2 as control for carpal joint and 2 as control for fetlock joint.

II- Sample collection, bacterial isolation and identification:

Under strict complete aseptic conditions, the synovial effusion samples were obtained aseptically by arthrocentesis of the involved joints using sterile syringes. The synovial specimens were transferred to sterile rubber capped test tubes to the laboratory in which they were directly

inoculated into brain heart infusion broth and overnight incubated aerobically at 37°C. A loopfull from the incubated broth was subcultured on ovine blood agar and another on MacConkey agar plates which were incubated at 37°C for 24-48 hours. Identification of the isolated strains were carried out according to *COLES (1986).* The antibiogram of the isolated organisms was applied by radial diffusion technique described by *BAUER et al (1966)* using 10 different antibiotic discs - Biomeriux - [Bactrim (35μg), Kanamycin (30μg), Neomycin (30μg), Streptomycin (10 μg), Chloramphenicol (30μg), Garamycin (30μg), Gentamycin (10μg), Flumequine (30mg), Rifampicin (30μg) and Polymyxin (30μg)].

RESULTS

The results were manifested in tables 1 & 2.

DISCUSSION

Positive identification of microorganisms isolated from pathognomic synovial membranes is essential to establish the diagnosis of infectious septic arthritis *(VAN PELT 1972).* If the infection is allowed to persist, lrriversible damage can occur to the articular cartilage *(STASHAK 1987),* but if the infection can be eliminated before that damage, horses can return to athletic function, so septic arthritis should be treated as an emergency *(SCHNEIDER et al 1992).* In Egypt, Farmers use donkeys as carrying or draft animals, so when they become lame or can not bear weight, great loss will be the result.

The most important methd for diagnosis of septic arthritis is the synovial fluid analysis to confirm the presence of sepsis in the joint *(MCILWRAITH 1987).* As the permeability of the synovial membrane for microorganisms is greater than the permeability of membranes of other body cavities *(VAN PELT and LANGHAM 1968).* This may be due to that the configuration of capillary tufts in the synovial membrane favors entrapment of microorganisms, hence bacteria in the blood stream gain access more readily to synovial fluid than other body fluids. So, these factors promote the establishment of the infection in the synovial membrane *(STASHAK 1987).*

The present study revealed recovery of a single isolate from each synovial sample of 21 examined joint (12 carpal, 8 fetlock and one pastern). Only one case in the present investigation revealed no bacterial growth and this failure for isolation may be due to absence of bacteria in synovial effusion sample at the time of arthrocentesis *(VAN PELT 1972).*

Also it may be due to the primary localization of the organism in the synovial membrane or due to prior administration of antibiotics *(STASHAK 1987).*

Staphylococcus sp. resembled the highest proportion of isolates (61.9%). These present findings coincided with the results obtained by *ROSE and LOVE (1979), LAPOINTE et al (1992) and SCHNIEDER et al (1992).* Three cases of them yeilded *Staph aureus* (14.28%) and 10 cases yeilded *Staph epidermedis* (47.62%). Corynebacterial infections represented 23.81% in the present study. *FIRTH (1980)* had isolated *Corynebacterium equi* from septic arthritis in foals. In the present investigation septic arthritis caused by *Corynebacterium pyogenes* (4.77%) was characterized by extremely severe lesions (severe lameness, purulent wounds, large swellings) if compared with that in arthritis caused by other microorganisms. These findings agreed with those obtained by *VAN PELT and LANGHAM (1968)* where they stated that septic arthritis caused by *Corynebacterium pyogenes* whether singly or in combination with other microorganisms were almost pathognomonic and produce severe lesions in contrast to lesions seen in infectious arthritis caused by other microorganisms. This is due to presence of large amounts of purulent debris that retard the action of many antibiotics by decreasing the metabolic rate of bacteria. As a single isolate was obtained from any septic arthretic case and regarding to the species of the most proportions of these isolates, haematogenous form of septic arthritis is the most probable form in the present investigation. While in cases No. 11, 13 and 22 which showed metacarpal or phalengeal fracture as well as cases No. 5, 20 and 26 which showed superficial purulent injuries adjacent to the involved joint represented the traumatic form of septic arthritis. This result is supported by the openion stating that traumatic septic arthritis is usually associated with a direct injury but the joint need not be punctured and a severe injury adjacent to the joint can lead to cellulitis. So septic arthritis develops following this period *(MCILWRITH 1987).* The author mentioned that the prognosis for all cases of septic arthritis is never good even with early and correct treatment.

From the antibiogram in the present study-disregarding any correllation problems between in vetro sensitity and clinical effectiveness-it can be seen that if a single antibiotic is used, bactrim will be the best choice. It is a trimethoprim and sulphonamide combination, which if they are given together, they will result in a marked enhancement (synergism) of the activity of both drugs *(TAWETZ 1992).* Bactrim provide synergistic antimicrobial activity in vetro and in vivo against many microorganisms and have been suggested for use in treatment of numerous infections

including infectious arthritis *(ADAMSON et al 1985)*. Rifampicin gave good results in vetro in the present work, but the administraton of rifampicin as a single drug permits the emergency of highly resistant microorganisms *(TAWETZ 1992)*. So, it is not advisable to use it as a single drug. Flumequine followed by chloramphenicol gave also satisfactory results in vetro, but some attention to chloramphenicol as it is mainly bacteriostatic and the growth of microorganisms resumes when the drug is withdrawn *(TAWETZ 1992)*. Kanamycin, garamycin, neomycin and gentamycin which are aminoglycosides components gave varied intermediate sensitivity results in vetro, but they have some limitations in vivo due to low PH of the synovial effusion in infectious arthritis and the activity of them is reduced significantly with the decrease in PH *(WARD and STEIGBIGEL 1978)*. In the present study, gentamycin gave the least valuable results of all aminoglycosides. It is advocated for use in equine infectious arthritis *(MORRIS 1980)*, while *RIVIERE et al (1982)* concluded that gentamycin due to its narrow therapeutic range, is associated with nephrotoxicosis in horse. So clinicians should be careful with the prolonged use of aminoglycosides-particularly gentamycin - in foals *(STASHAK 1987)*. All recovered isolates in the present study showed resistance to polymyxin in vetro assay.

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Table 1: Clinical examination of affected joints and bacterial cuture of the synovial effusions in donkeys.

No.	Age (Y)	Sex	Joint	Affection	Synovial volum (ml)	Culture
1	4	F	c (L)	Swelling	2.5	*Staph. epid*
2	3	F	c (L)	Swelling, Lameness	2	*Staph. aureus*
3	3	M	c (R)	Swelling, Lameness	1.5	*Staph. epid*
4	2.5	M	c (L)	exostosis, Lameness	2	*Staph. epid*
5	3	M	c (L)	purulant wound, severe lameness	1.5	*Coryn. pyogenes*
6	2	F	c (L)	swelling, mild lameness	2	*Coryn. equi*
7	1.5	F	c (R)	swelling	1.5	*Staph. epid*
8	5	M	c (L)	exostosis, lameness	2	*Staph. epid*
9	4	M	c (L)	swelling, lameness	2	*Staph. epid*
10	2.5	M	c (L)	swelling	2	No growth
11	3	M	c (R)	metacarpal fracture, lameness	1.9	*Enterobacter aerogenes*
12	2	F	c (R)	swelling, lameness	1	*Coryn. epui*
13	1.5	F	c (R)	metacarpal fracture, lameness	1.2	Shigella sp.
14	4	M	c (L)	control animal	1.5	No growth
15	3	M	c (L)	control animal	2	No growth
16	5	M	Ft(R)	swelling	1.5	*Staph. epid*
17	3	F	Ft(R)	swelling, lameness	1	*Staph. epid*
18	2	F	Ft(R)	exostosis, lameness	0.3	*Staph. aureus*
19	2	M	Ft(L)	swelling, lameness	2..1	*Staph. epid*
20	1.5	F	Ft(L)	purulent wound, lameness	0.5	*Coryn. equi*
21	2	F	Ft(L)	swelling, lameness	1.5	*Coryn. equi*
22	2	F	Ft(R)	Phalengeal fracture, lameness	1.8	*Enterobacter aerogenes*
23	1.5	F	Ft(R)	exostosis, lameness	0.8	*Staph. epid*
24	4	M	Ft(R)	control animal	1	No growth
25	1.5	M	Ft(R)	control animal	1.5	No growth
26	3	F	P(R)	injured joint, lameness	2.1	*Staph. aureus*

M= Male , F= Female , C= Carpal , Ft= Fetlock , P= Patern

.Table 2 : Antibiogram of the isolated organisms from septic arthritis in donkeys.

isolated organisms	No. of isolate	Bactrim	Kanamycin	Neomycin	Streptomycin	Chloramphenicol	Garamycin	Gentamycin	Flumequine	Rifampicin	Polymyxin
Staph. epid.	10	+ +	+	+	+	+ +	+	+	+ +	+ + +	-
Staph. aureus	3	+ + +	+	+	-	+ +	+	+	+ +	+	-
Coryn. pyogenes	1	+ + +	+ +	+	+ +	+ +	+	+	+ +	+ +	-
Coryn. equi	4	+ +	+ +	+ +	-	+ +	+ +	+	+ +	+ + +	-
Enterobacter aerogenes	2	+ + +	+ +	+	+ +	+	+ +	+ +	+ +	+ + +	-
Shigella sp.	1	+ + +	+ +	+ +	+ +	+ +	+ +	+	+ +	+	-

+++ = inhibition zone 14 - 19 mm + = inhibition zone 3 - 5 mm

++ = " " 8 - 12 mm - = Resistance