Location of Isolates and Sensitivity Patterns for Bacteria Isolated from Ostrich Samples

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Introduction

As veterinarians, if we could successfully treat all bacterial diseases with one miracle drug we would be out of a job. Even today ostrich farmers request a single antibiotic that will cure infections affecting all organ systems in the body. As you know, ratite medicine is not so simple.

In this paper, a retrospective study of bacterial isolates from ostriches was made to see if any patterns associated with anatomical location, identity of isolate and antibiotic sensitivity would be helpful to practicing veterinarians in instituting antibiotic therapy while waiting laboratory results.

Materials and methods

All submissions from ostriches to a private veterinary diagnostic laboratory (Veterinary Pathology Services, Brisbane) were reviewed from January 1993 to May 1994. Those cases which requested bacteriology and from which isolates were grown were selected for the retrospective study.

Material for bacteriology was either fresh tissue (whole bird for necropsy or fresh tissue in sterile container) or swab (in Stewart's transport medium). Some specimens took up to 24-36 hours to reach the laboratory from time of sampling.

All samples were routinely inoculated onto horse blood agar, McConkey agar with crystal violet, horse blood CNA agar, and some samples into XLD medium, mannitol selenite broth and campylobacter agar. Nutrient broth was used as an enrichment medium in some cases.

Plates were incubated for up to 48 hours at 37°C.

Sensitivity testing by the Kerby-Bauer method against penicillin, ampicillin, oxytetracycline, sulphadiazine, co-trimoxazole, neomycin, clavulox, nitrofuran, lincospectin, lincomycin and tylosin was on Sensitest agar at 37°C.

Bacteria were identified by routine laboratory methods and sometimes by the Microbact 12A/B system. They were reported to Genus only.

Salmonella spp were serotyped by the Salmonella reference laboratory in Adelaide.

Streptococci were identified into two groups based on colony morphology and haemolysis of blood, Gram stain and basic biochemistry using the catalase test. Groups included ß haemolytic Streptococci and all others (both α haemolytic and nonhaemolytic streptococci).

Results

Fourteen different Gram negative organisms and four classes of Gram positive organisms were isolated from various locations (Tables 1a, 1b).

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These isolates were all tested against a range of antibiotics and their sensitivities tabulated (Table 2).

From some sites these were multiple isolates.

Discussion

Submission of oviduct swabs was usually part of normal management although some were sent to investigate infertility. The wide variety of organisms isolated presumably reflects both normal flora which includes *E. coli*, *Corynebacterium spp*, *Staphylococcus spp*, non haemolytic *Streptococci spp* as well as contamination while taking samples.

Genital tract organisms may also be pathogenic considering a similar range of isolates were made from the neonatal group. Here infection may have occurred while the egg passed down the oviduct. The possibility of environmental contamination cannot be forgotten and cleanliness of incubators, hatchling environment etc is very important.

The respiratory tract appears to have its own normal flora which may become pathogenic under unknown circumstances. *Pseudomonas spp* is the most significant organism in the

As expected, *E. coli* had a wide distribution of sites but the importance of *Pseudomonas spp*, staphylococci and streptococci particularly faecal streps cannot be understated.

All these organisms have been reported as pathogens in Australia but numerical data on specific anatomical locations is not available (Black 1993, Munro 1993).

The sensitivity patterns don't hold many surprises. There is still no miracle drug although lincospectin probably is the best allrounder. Problems with resistance will become a feature of ratite medicine in the future as more birds are treated with a wider range of drugs.

Are there antibiotics that you would like to use by which we don't routinely test against? If so, inform your laboratory so that meaningful results are obtained.

References

Black, D (1993). Ostrich Examination - What To Look For! In "Ostrich Odyssey" Proceeding No. 217, Post Graduate Committee in Veterinary Science, University of Sydney pp 99-112.

Munro, BE (1993) Infectious Diseases of Ostrich in "Ostrich Odyssey" Proceeding No. 217, Post Graduate Committee in Veterinary Science, University of Sydney pp 99-112.

Table 1a

Bacteria isolated from various genital, neonatal and gastrointestinal locations from ostriches - January 1993 to May 1994.

Site of Isolation	No	*Acinetobacter sp*	*Aeromonas sp*	*Alcaligenes sp*	*Bacillus sp*	*Citrobacter sp*	*Corynebacterium sp*	*Enterobacter sp*	*E. coli*	*Klebsiella sp*	*Pasteurella sp*	*Proteus sp*	*Pseudomonas sp*	*Salmonella sp*	*Serratia sp*	*Staphylococcus sp*	β *Streptococcus sp*	oth *Streptococcus sp*	*Yersinia sp*
Genital																			
Oviduct	83	1			4		16	1	32	1	1		2		3	16		6	
Penis	4						1		1							1		1	
Neonatal																			
Egg	14	2			1	1	2	1					3		1			3	
Foetus	3	1						2											
Umbilicus	4						1	1								1		1	
Yolk Sac	41				5		1	1	11	1	1		3	1		5		12	
Gastrointestinal																			
Pharynx	16	1		1			1	2	4	2			1		1	1		2	
Proventriculus	1												1						
Gizzard	2												1					1	
Intestine	46					1	1	1	22	4		3	1	1	1			10	1
Cloaca/Faeces	25			1			1		12					2		1	2	6	
Subtotals	239	5	-	2	10	2	24	9	82	8	2	3	12	4	6	25	2	42	1

Table 1b

Bacteria isolated from various respiratory, and miscellaneous locations from ostriches - January 1993 to May 1994

Site of Isolation	No	*Acinetobacter sp*	*Aeromonas sp*	*Alcaligenes sp*	*Bacillus sp*	*Citrobacter sp*	*Corynebacterium sp*	*Enterobacter sp*	*E. coli*	*Klebsiella sp*	*Pasteurella sp*	*Proteus sp*	*Pseudomonas sp*	*Salmonella sp*	*Serratia sp*	*Staphylococcus sp*	β *Streptococcus sp*	oth *Streptococcus sp*	*Yersinia sp*
Respiratory																			
Eye	8	1	1				1						3			2			
Nasal	5	1					1						1			1		1	
Trachea	17	1	2					3	4				4			2		1	
Lung	6		1						2				3						
Airsac	10		1					1		2		1	3		1			1	
Chest	5	1		1									2			1			
Other Sites																			
Liver	6						1		2				2					1	
Kidney	2								1									1	
Bone	2								1									1	
Skin	5	1	1						1								1	1	
Subcutaneous	2												2						
Blood	1															1			
Abdomen	5								1				2			1		1	
Subtotal (1b)	74	5	6	1	-	-	3	4	12	2	-	1	22	-	1	8	1	8	-
Subtotal (1a)	239	5	-	2	10	2	24	9	82	8	2	3	12	4	6	25	2	42	1
Grand Total	313	10	6	3	10	2	27	13	94	10	2	4	34	4	7	33	3	50	1

Antibiotic	*Acinetobacter sp*	*Aeromonas sp*	*Alcaligenes sp*	*Bacillus sp*	*Citrobacter sp*	*Corynebacterium sp*	*Enterobacter sp*	*E. coli*	*Klebsiella sp*	*Pasteurella sp*	*Proteus sp*	*Pseudomonas sp*	*Salmonella sp*	*Serratia sp*	*Staphylococcus sp*	β *Streptococcus sp*	oth *Streptococcus sp*	*Yersinia sp*
Penicillin	0	0	0	40	0	93	0	0	0	100	0	0	0	0	45	100	48	0
Ampicillin	50	0	100	40	0	96	31	82	0	100	100	9	100	29	48	100	56	100
Tetracycline	100	100	67	60	100	89	54	67	90	100	0	33	75	71	85	0	56	100
Sulphadiazine	80	17	100	40	0	67	23	29	0	100	75	9	0	43	79	0	6	0
Co-trimoxazole	80	83	100	50	100	74	77	88	30	100	100	6	100	100	97	0	84	100
Neomycin	100	100	100	80	100	100	92	99	90	100	100	85	100	100	97	0	40	100
Clavulox	50	0	100	50	50	96	38	87	60	100	75	12	100	71	100	100	98	100
Nitrofuran	0	67	0	60	50	30	0	40	30	50	0	0	25	0	39	0	44	0
Lincospectin	70	100	67	90	100	96	92	79	80	50	75	35	75	86	100	100	100	100
Lincomycin	100	0	0	50	0	89	0	0	0	50	0	3	0	0	70	100	16	0
Tylosin	100	0	0	90	0	93	0	1	0	50	0	0	0	0	94	100	78	0
Number of isolates tested	10	6	3	10	2	27	13	94	10	2	4	34	4	7	33	3	50	1

Table 2: Percentage of isolates from various locations from ostriches sensitive to various antibiotics - January 1993 to May 1994