Characteristics of *Clostridium perfringens* strains isolated from turkeys.

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The problem

In recent years, outbreaks of necrotic enteritis in turkeys have become an emerging problem. The outbreaks occur usually in turkeys aged 4-8 weeks, often in springtime and are characterised by a sudden increase in mortality. In this study *Clostridium perfringens* strains were isolated from diseased turkey flocks, characterised and susceptibility testing to ionophores and antimicrobials was performed.

Picture 1. Necrotic lesions in the intestine of a 4 week old turkey

How we investigated the problem

Isolation and characterisation

Samples from diseased turkeys were collected in Italy (2014-2020), The United Kingdom (2021) and France (2021). The age of the turkeys at the time of collection ranged between 12-385 days; with 93% of the isolated strains collected between 12-48 days. Swabs from necrotic lesions were cultured to isolate *Clostridium perfringens* and the isolates were toxinotyped and screened for netB and beta2 encoding genes.

MIC testing

The susceptibility of 30 Italian strains to 5 antimicrobials (amoxicillin, doxycycline, lincomycin, penicillin and tylosin) and 2 ionophores (monensin and lasalocid) was studied through the agar dilution method for the detection of the minimum inhibitory concentration (MIC).

Results

Isolation and characterisation

Isolation success :

- Isolation from all diseased flocks
- Isolation success: 16-100%

Characterisation :

- Toxinotype A : 100%
- netB : not detected
- beta2 encoding genes : 57%
- Same pattern if multiple strains from the same outbreak were typed

MIC testing results

MIC distributions per number of strains and MIC_{50} and MIC_{90} values (µg/mL)																	
Antimicrobials	0.016	0.031	0.063	0.125	0.25	0.5	1	2	4	8	16	32	64	128	256	MIC_{50}	MIC_{90}
Tylosin					1	27	2									0.5	0.5
Penicillin			2	9	17	1		1								0.25	0.25
Amoxicillin	2	3	16	8	1			1								0.063	0.125
Lincomycin						8	2		3	13	2	2				8	16
Doxycycline		8		1					10	9	2					4	8
Ionophores	0.016	0.031	0.063	0.125	0.25	0.5	1	2	4	8	16	32	64	128	256	MIC_{50}	MIC_{90}
Monensin						2	7	19	2							2	2
Lasalocid									30							4	4

Implications / Conclusions

The results confirm that the most prevalent *Clostridium perfringens* toxinotype involved in NE outbreaks of turkeys is type “A”, netB negative and beta2 toxin positive in approximately half of the cases.

All isolates showed varying degrees of sensitivity to the antimicrobials tested in this study.