



Efeito do estresse do transporte nos componentes do sangue e lavado broncoalveolar em bezerros.

COMPARATIVE CLINICAL PATHOLOGY

Fator de Impacto: 0,9

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Neonato Bovino

50% dos tratamentos

Sistema Imune

Particularidades
Anatômicas e
fisiológicas
Trato respiratório

FALHA

Transferência de imunidade

ESTRESSE

Broncopneumonia

Broncopneumonia

Sinais Clínicos X Gravidade

- ✦ Anorexia, Fraqueza
- ✦ Febre
- ✦ Secreção nasal e ocular
- ✦ Tosse, dispnéia
- ✦ Áreas de crepitação, ronco, sibilo

Diagnóstico

- ✦ Exame Físico
- ✦ Radiografia, Endoscopia, US,
- ✦ LAVADO

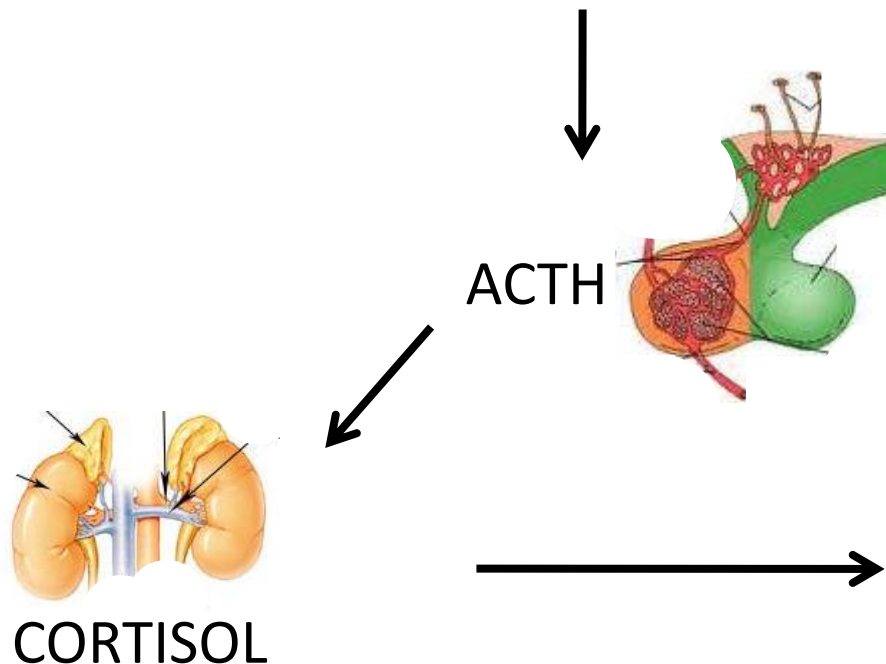
Etiologia

- ✦ Multifatorial
- ✦ Bactérias, fungos, vírus,
- ✦ Agentes químicos, físicos



ESTRESSE

“Ocorre quando os mecanismos de adaptação fisiológicos são ativados em excesso à um estímulo externo.”



1. Estabilização das membranas lisossômicas;
2. ↓ permeabilidade dos capilares
3. ↓ da migração de leucócitos
4. **Supressão do sistema imune**

Introdução



Avaliação do uso de um antibiótico no tratamento de diarreia e broncopneumonia em bovinos neonatos.

Estudo transversal - Grupo de animais acompanhado desde o nascimento até a 10ª semana de vida

Exame clínico, específico do sistema respiratório

Coleta do lavado traqueobrônquico 0-72h após o tratamento

Determinação

Intensidade da broncopneumonia
Agente etiológico



Introdução



Lavagem Traqueobrônquica por traqueostomia

Técnica

Citológico

Microbiológico

Bioquímico

Células epiteliais

Neutrófilos

Macrófagos

Linfócitos



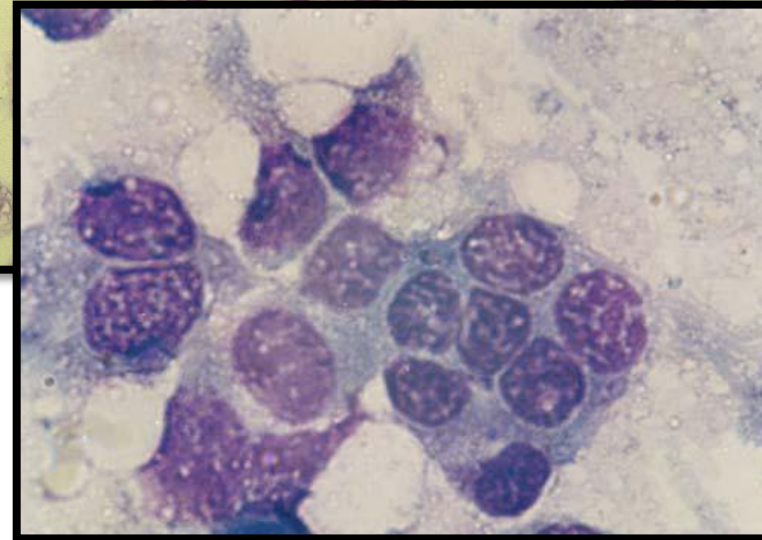
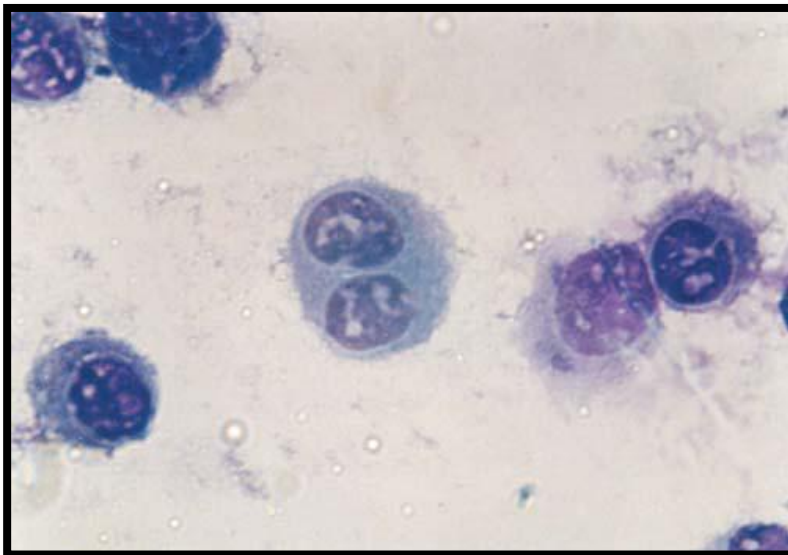
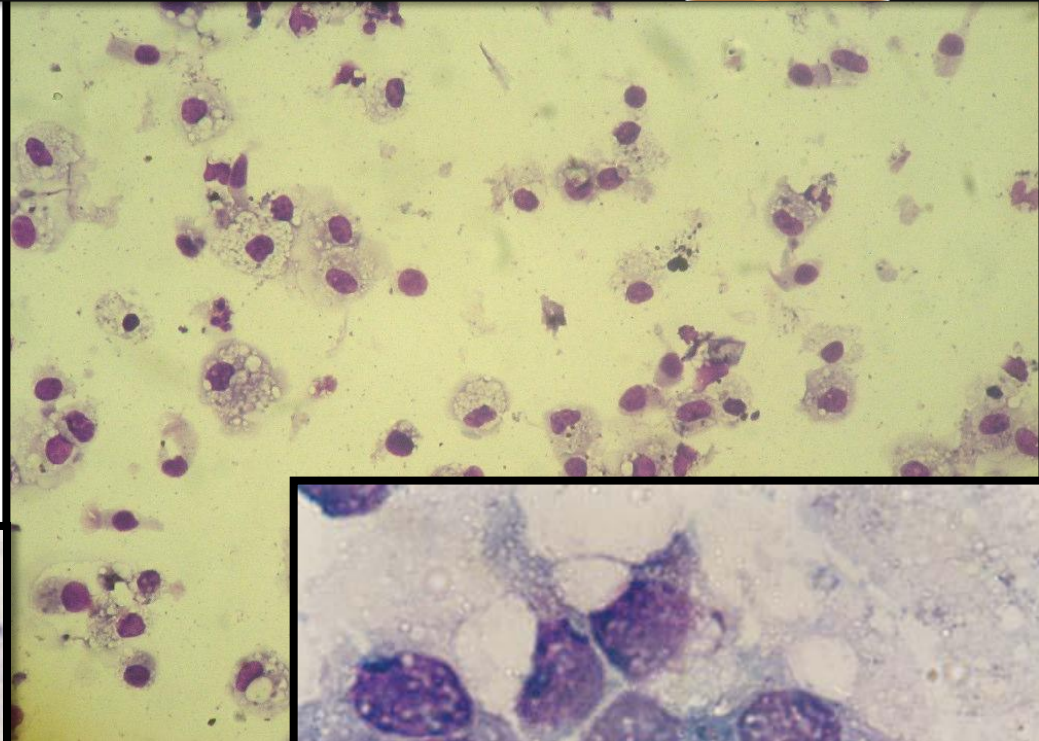
Introdução



Macrófagos alveolares

50% a 90% do total de células

em bovinos saudáveis

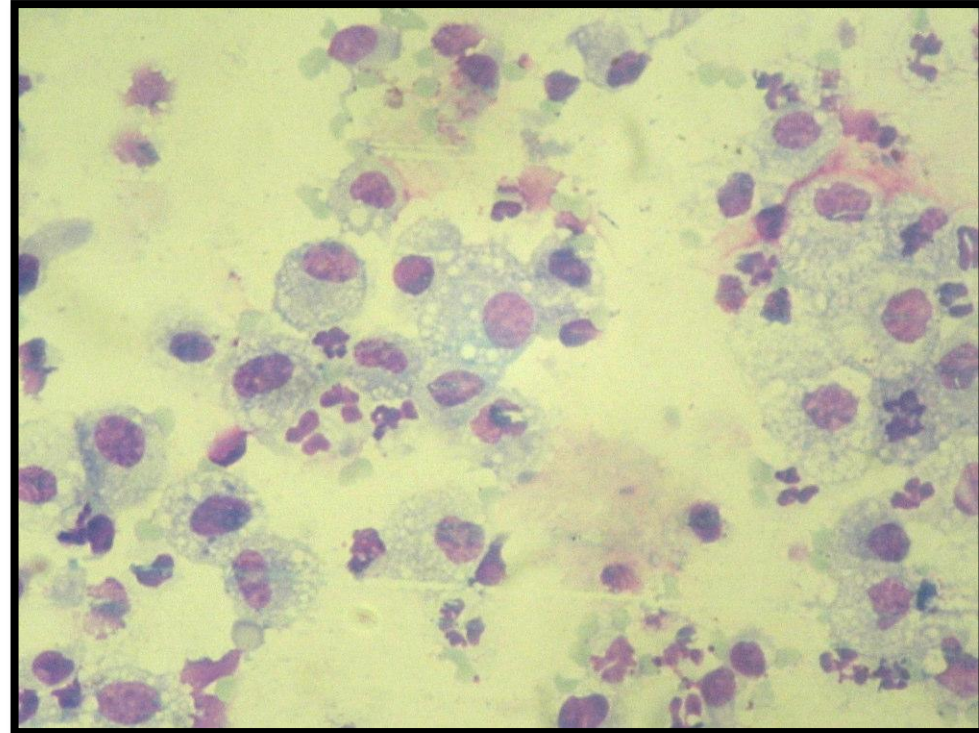


Introdução



Durante a fase aguda da infecção

Aumento → **neutrófilos**
linfócitos



Objetivo



Avaliar o efeito do estresse do transporte nos parâmetros bioquímicos, hematológicos e no conteúdo do lavado broncoalveolar em bezerros.



Materiais e métodos



Materiais e métodos



20
bezerros



- Machos
- 4-10 meses de idade
- 160 kg
- Saudáveis



21 dias



Parâmetros

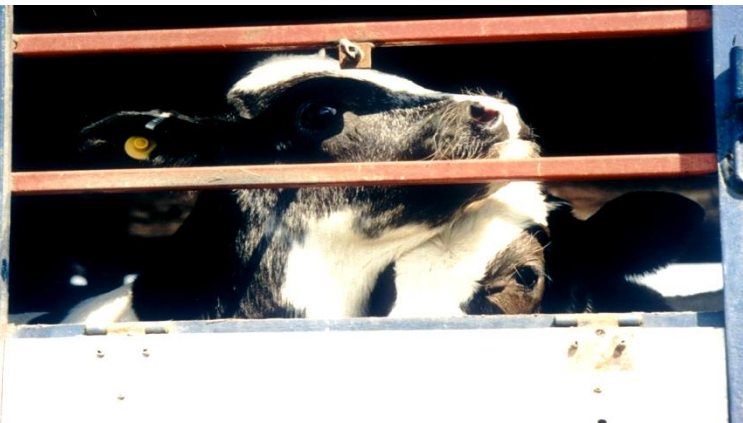
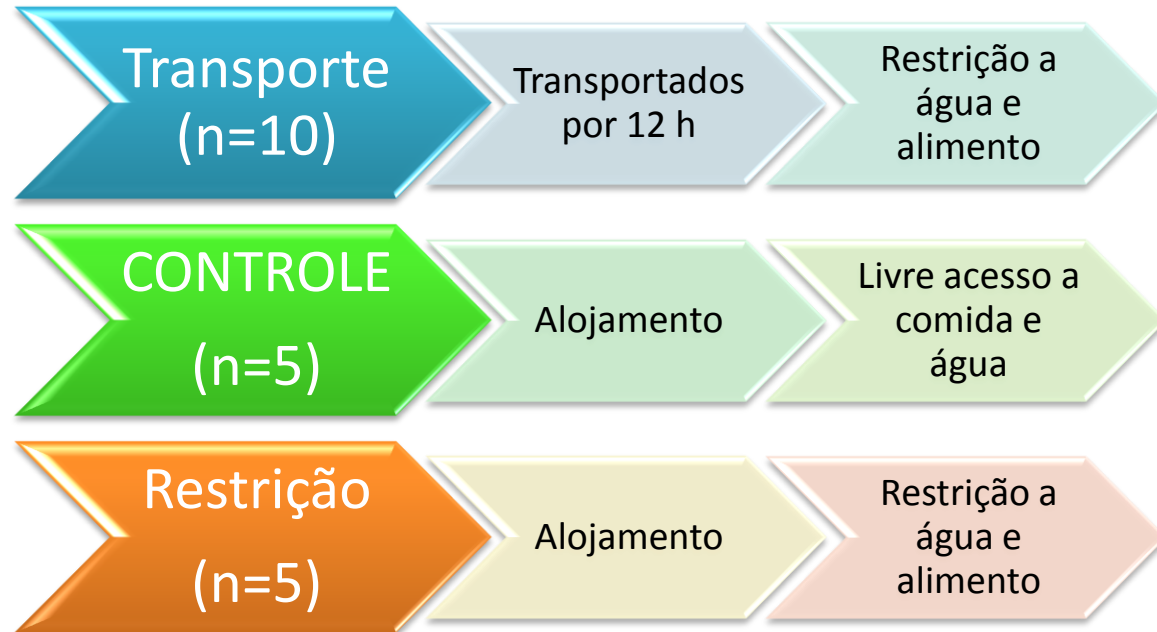


Materiais e métodos



**20
bezerros**

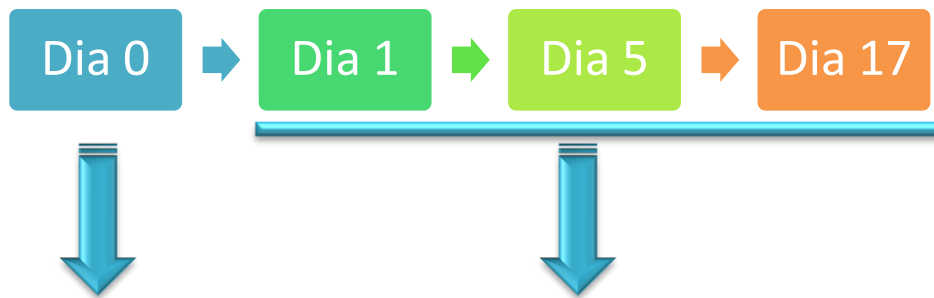
Dia 0



Materiais e métodos



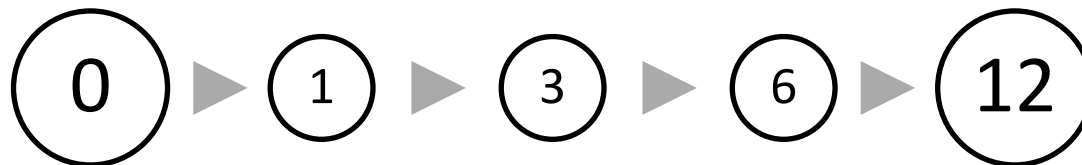
Dias de coletas



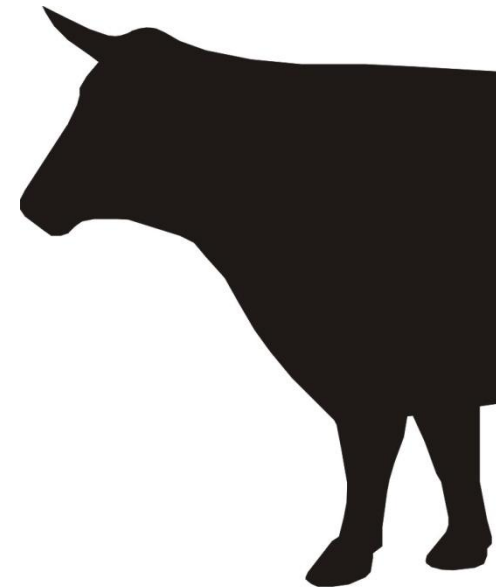
Todos Grupos

Grupos Transporte e Restrição

- * Swab
- * Sangue
- * Lavado broncoalveolar



Horas de transporte no dia 0





RESULTADOS E DISCUSSÃO

Table 1 Hematological, biochemical, and hormonal parameters of calves in the experimental group and control groups 1 and 2 on transportation day (mean±standard error)

Cortisol (nmol/l)	Fib (g/l)	Alb (g/l)	TP (g/l)	Eos (×10 ⁹ /l)	Mon (×10 ⁹ /l)	Lymph (×10 ⁹ /l)	Neut (×10 ⁹ /l)	WBC (×10 ⁹ /l)	RBC (×10 ¹² /l)	Hb (g/l)	PCV (l/l)	Time of sampling (hour)	Number	Group
70.91±19.31	2.90±0.30	30.80± 2.30	65.60±2.20	0.05± 0.03	0.04±0.02	4.93±0.27	1.50±0.26	6.52±1.23	8.38±0.52	92.80±6.10	0.30±0.01	0	5	Controle
60.42±20.97	3.80±0.40	31.20± 3.20	68.20±3.20	0.02± 0.02	0.07±0.03	5.29±0.14	1.33±0.17	6.70±0.43	8.33±0.9	96.60±9.90	0.31±0.03	1	5	
33.93±14.07	2.80±0.29	30.20± 3.20	67.20±2.40	0.01± 0.01	0.06±0.03	5.34±0.34	1.75±0.34	7.16±1.51	8.07±0.4	95.20±6.30	0.31±0.02	3	5	
36.14±7.17	3.50±0.11	30.00± 4.10	66.40±1.70	0.01± 0.01	0.04±0.03	5.65±0.39	2.01±0.38	7.72±0.56	8.06±0.57	96.20±2.40	0.31±0.01	6	5	
40.83±11.03	4.50±0.28	30.10± 3.90	67.20±2.90	0.06± 0.03	0.09±0.03	5.96±0.27	1.70±0.26	7.82±1.06	8.05±0.37	93.20±7.50	0.31±0.02	12	5	
56.01±13.24	4.10±0.22	30.60± 3.00	64.20±2.30	0.02± 0.02	0.07±0.02	5.02±0.49	1.20±0.52	6.32±0.88	8.40±0.32	98.40±4.50	0.31±0.01	0	5	Restrição
36.42±3.03	4.60±0.02	32.80± 2.30	67.80±2.20	0.07± 0.03	0.09±0.02	5.02±0.47	1.67±0.47	6.86±1.11	8.36±0.79	101.00± 4.70	0.32±0.01	1	5	
63.18±9.65	4.60±0.05	33.80± 2.30	68.60±2.00	0.03± 0.01	0.03±0.02	5.10±0.14	1.73±0.14	6.93±1.42	8.37±0.79	99.00±3.50	0.32±0.02	3	5	
62.35±4.13	6.60±0.18	35.00± 2.30	69.00±2.60	0.02± 0.02	0.04±0.02	5.67±0.51	2.02±0.47	7.77±2.15	8.70±0.12	98.00± 12.90	0.32±0.03	6	5	
33.11±6.89	6.80±0.09	36.00± 7.90	73.90±3.40	0.01± 0.01	0.01±0.01	5.88±0.28	2.03±0.27	7.95±0.56	8.75 ^c ± 0.45	101.20± 7.20	0.32 ^c ± 0.01	12	5	
77.80±6.89	3.20±0.18	33.70± 2.00	66.30±4.20	0.04± 0.02	0.07±0.02	4.43±0.18	1.62±0.17	6.16±0.47	8.34±0.64	97.00±3.90	0.31±0.01	0	10	Transporte
80.01 ^b ±12.69	3.35±0.28	33.80± 2.70	67.00±2.10	0.05± 0.02	0.03±0.02	4.29 ^a ±0.14	2.38 ^{a,b} ± 0.14	6.77±0.40	8.40±0.89	100.80± 4.30	0.32±0.01	1	10	
108.98 ^a ± 20.41	5.00±0.05	35.00± 2.70	71.00±1.50	0.03± 0.01	0.06±0.02	4.26 ^{a,b} ± 0.22	2.80 ^{a,b} ± 0.22	7.15±0.92	8.44±0.43	96.10±2.50	0.33 ^a ± 0.01	3	10	
96.84 ^{a,b} ±9.65	6.70±0.18	36.00± 2.70	72.00 ^a ± 1.90	0.03± 0.01	0.10±0.02	4.74 ^{a,b} ± 0.37	3.67 ^{a,b} ± 0.39	8.47±0.76	8.80±0.87	102.90± 5.40	0.33 ^a ± 0.01	6	10	
67.59 ^{a,b} ±6.34	8.00 ^{a,b} ± 0.03	37.00± 2.40	79.00 ^a ± 4.60	0.02± 0.01	0.03 ^a ± 0.02	4.22 ^{a,b} ± 0.39	4.94 ^{a,b} ± 0.39	9.30 ^{a,b} ± 1.06	8.90 ^a ± 0.35	108.40± 3.40	0.34 ^a ± 0.01	12	10	

^a Indicates statistical significance ($p<0.05$) between experimental group and control group 1^b Indicates statistical significance ($p<0.05$) between experimental group and control group 2^c Indicates statistical significance ($p<0.05$) between control groups 1 and 2

Table 2 Hematological, biochemical, and hormonal parameters of calves in experimental group and control groups 1 and 2 (mean±standard error)

Cortisol (nmol/l)	Fib (g/l)	Alb (g/l)	TP (g/l)	Eos (×10 ⁹ /l)	Mon (×10 ⁹ /l)	Lymph (×10 ⁹ /l)	Neut (×10 ⁹ /l)	WBC (×10 ⁹ /l)	RBC (×10 ¹² /l)	Hb (g/l)	PCV (l/l)	Time (days after transportation)	Number	Group
71.46±9.38	1.68±0.51	27.20±2.50	66.30±4.50	0.04±0.02	0.23±0.04	4.59±0.21	1.48±0.19	6.34±1.02	8.54±0.75	92.80±4.50	0.31±0.01	-5	5	Controle
70.74±9.87	1.71±0.58	28.16±2.73	65.76±4.72	0.09±0.03	0.24±0.05	4.52±0.19	1.43±0.23	6.28±0.97	8.43±0.81	93.62±3.94	0.30±0.01	0		
56.01±19.59	2.30±0.47	36.40±2.20	61.20±5.80	0.02±0.01	0.17±0.08	4.60±0.24	1.34±0.16	6.14±0.76	8.39±0.76	98.80±1.60	0.32±0.01	-5	5	Restrição
99.32±8.82	6.80±0.50	32.60±2.90	64.20±5.00	0.06±0.02	0.12±0.05	4.38±0.56	1.71±0.52	6.28±2.40	8.50±0.83	100.50±5.70	0.31±0.01	1	5	
72.84±13.24	7.20±0.13	31.60±2.30	69.60±2.50	0.00±0.00	0.04±0.02	5.05±0.45	1.66±1.14	6.76±0.58	8.82±0.45	101.80±6.00	0.30±0.01	5	5	
57.66±6.34	4.00±0.10	37.00±2.40	67.60±2.00	0.16±0.01	0.11±0.03	5.38±0.29	1.04±0.30	6.70±0.32	8.23±0.98	97.60±3.10	0.30±0.01	17	5	
75.04±8.27	1.82±0.27	36.00±2.60	62.20±1.40	0.02±0.01	0.18±0.05	4.46±0.33	2.02±0.29	6.70±0.32	8.25±0.65	101.20±3.00	0.32±0.01	-5	10	Transporte
73.39±12.41	11.00 ^a ±0.04	33.10±1.20	70.10±3.40	0.02±0.02	0.05±0.02	4.14±0.16	1.96±0.18	6.18±0.63	8.52±0.71	98.40±7.50	0.32±0.01	1	10	
89.94±8.11	11.00 ^a ±0.04	30.2±2.40	68.90±1.20	0.00±0.00	0.22±0.09	5.02±0.65	1.63±0.66	6.88±1.33	8.82±0.71	96.60±3.70	0.31±0.01	5	10	
72.28±9.93	4.10±0.04	37.60±1.50	64.00±2.20	0.08±0.05	0.11±0.03	5.42±0.01	1.25±0.08	6.82±1.40	8.49±0.76	91.10±3.50	0.30±0.01	17	10	

^aIndicates statistical significance (*p*<0.05)

Table 4 Parameters in BAL fluid of calves in experimental group and control groups 1 and 2

Total protein (mg/l)	Epithelial		Neutrophil		Lymphocyte		Macrophage		Number of cells (/μl)	Volume of fluid	Time (days after transportation)	Group
	(/μl)	(%)	(/μl)	(%)	(/μl)	(%)	(/μl)	(%)				
36.60±5.40	3.71±1.26		10.62±5.27		56.83±19.16		662.75±27.71		743.00±23.97	46.20±3.10	-5	Controle
36.60±5.40	3.11±1.94		12.43±3.96		51.28 ^b ±16.78		710.18 ^b ±20.04		777.00 ^b ±33.97	47.60±3.60	0	
30.60±5.80	4.60 ^d ±1.91		7.20 ^d ±2.11		73.60±30.88		645 ^d ±27.45		710.40 ^d ±48.99	48.50±4.33	-5	Restrição
51.40±9.10	25.00 ^e ±7.04		15.40 ^e ±3.64		53.60 ^b ±20.22		631.8 ^{b,c} ±40.66		715.80 ^{b,c} ±44.01	50.54±3.83	1	
36.80±4.70	31.80 ^e ±4.84		9.80 ^e ±1.74		51.40±17.29		621.8 ^e ±31.2		714.60 ^e ±32.14	49.36±1.46	5	
35.20±4.80	17.80 ^d ±2.54		10.00 ^d ±3.49		48.40±12.5		662 ^d ±49.01		737.00 ^d ±47.26	50.02±1.43	17	
28.10 ^g ±2.80	3.90 ^d ±1.33		8.90 ^d ±4.55		62.70±10.48		649.5 ^d ±30.29		726.10 ^d ±37.47	47.64±2.30	-5	Transporte
174.00 ^{a,c,f} ± 23.10	50.40 ^e ±10.4		107.40 ^{*e} ± 24.09		83.90 ^b ±25.03		980.54 ^{b*,c} ± 120.18		1379.40 ^{b*,c} ± 183.06	47.30±1.61	1	
150.60 ^{a,f} ± 22.90	61.10 ^e ± 12.52		102.10 ^{*e} ± 23.63		74.40±8.67		1035.7 ^{a,e} ± 141.34		1337.30 ^{a,e} ± 177.81	48.40±1.25	5	
81.90 ^g ±19.00	52.10 ^d ± 29.94		22.50 ^d ±6.12		58.00±0.77		762.4 ^d ±46.72		881.40 ^d ±45.41	49.26±1.04	17	

*Indicates statistical increase

^a Indicates statistical significance between experimental group and control group 2

^b Indicates statistical changes between the first and second samplings

^c Indicates statistical significance between experimental group and control group 1

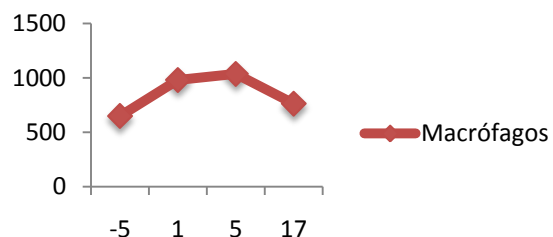
^{d,e} There were significant changes in the number of total cells, macrophages, neutrophils, and epithelial cells in second and third samplings in experimental group and control group 2 in comparison with first and fourth one ($p < 0.05$).

^{f,g} Changes of total protein in experimental group were statistically significant between second and third sampling in comparison with first and fourth one ($p < 0.05$).

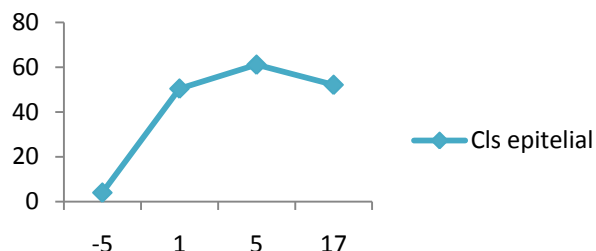
Resultados e discussão



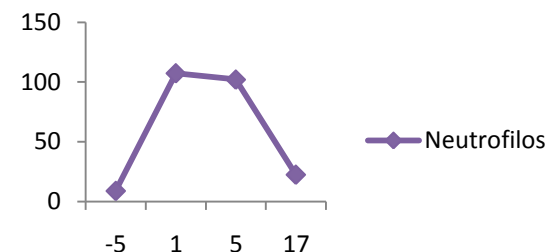
Macrófagos



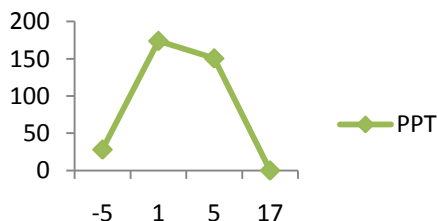
Células epiteliais



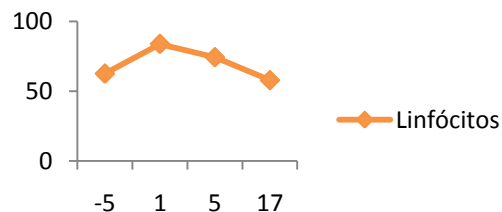
Neutrófilos



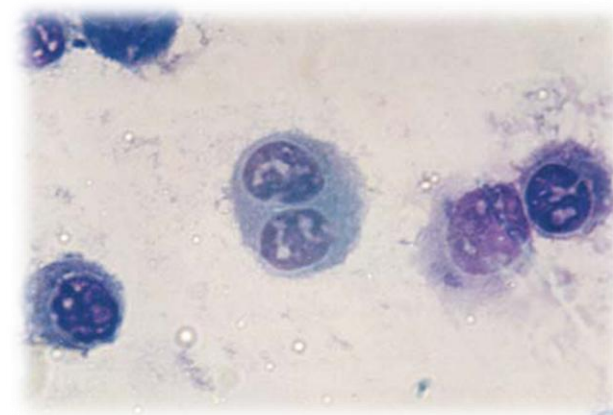
Proteínas Totais



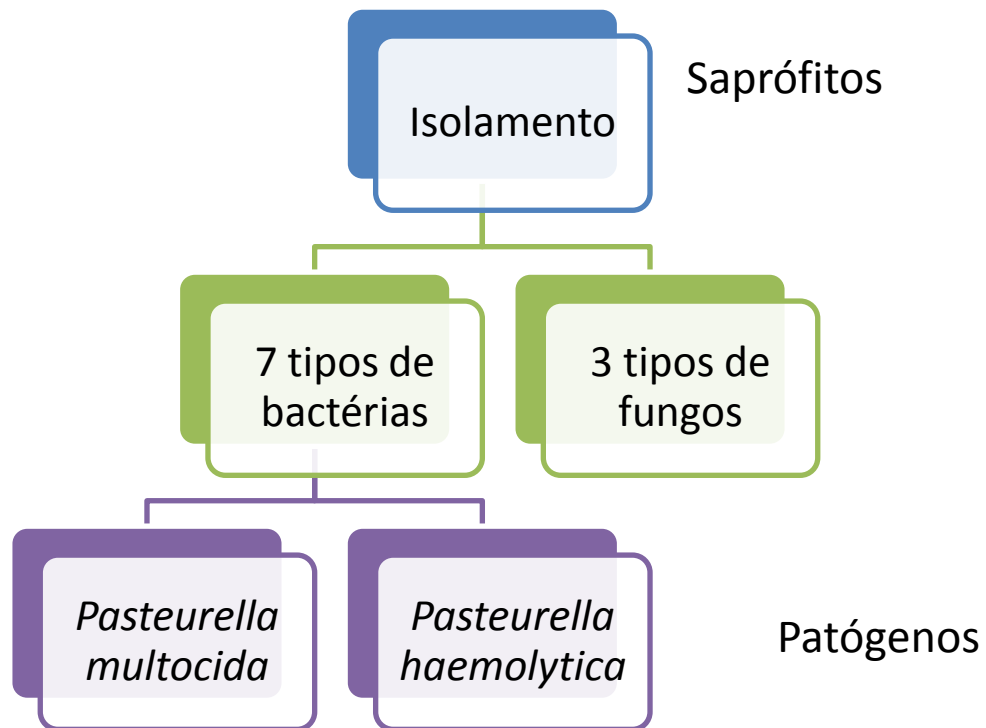
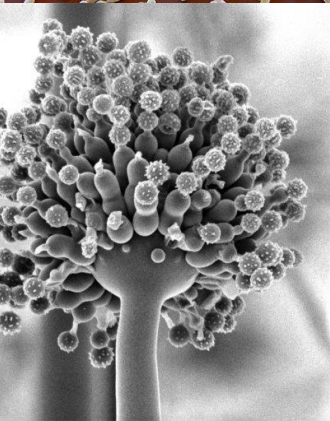
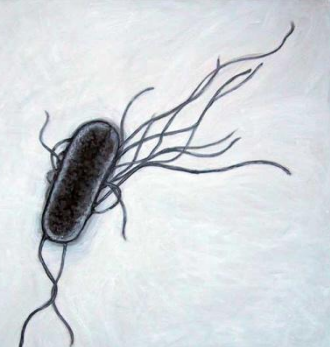
Linfócitos



Parâmetros em LBA dos bezerros do Grupo Transporte



Resultados e discussão



Resultados e discussão

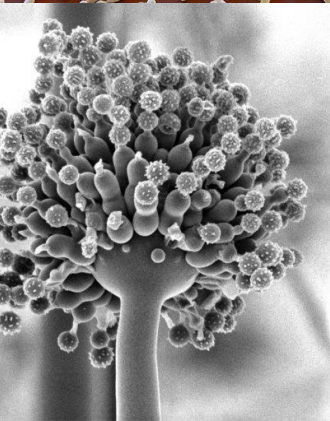
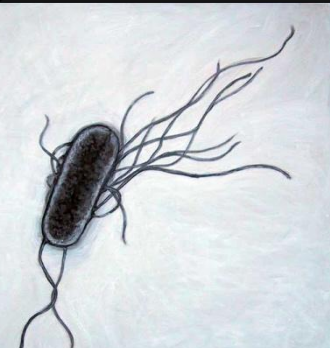


Table 3 Organisms isolated from nasal swab and bronchoalveolar fluid in calves before and after transportation

Groups	Controle				Restrição								Transporte							
	-5		0		-5		1		5		17		-5		1		5		17	
Time of sampling (days after transportation)	NS	BA	NS	BA	NS	BA	NS	BA	NS	BA	NS	BA	NS	BA	NS	BA	NS	BA	NS	BA
<i>Pasteurella haemolytica</i>	0	0	1	0	1	0	2	0	1	0	1	0	2	0	5	0	3	0	3	0
<i>Pasteurella multocida</i>	3	0	4	0	3	0	4	0	5	3	2	0	2	0	4	2	8	2	6	0

Resumindo...



Fatores de estresse



Cortisol

Diminuição cascata da inflamação

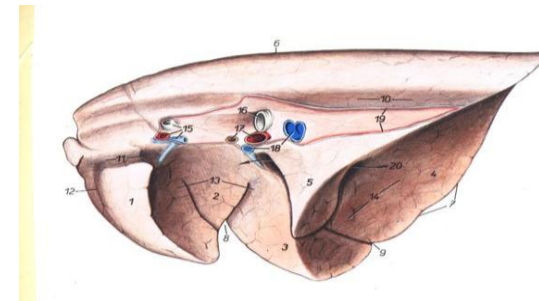


Distúrbios no mecanismo de defesa do trato respiratório



Sistema mucociliar

Produção de surfactante



Lavado broncoalveolar



Broncopneumonia



Bactérias oportunistas



Conclusão



O estresse do transporte provoca alterações no lavado broncoalveolar, e essas mudanças indicam um processo inflamatório no trato respiratório inferior. A causa pode ser devido a distúrbios no mecanismo de defesa do sistema respiratório: diminuição da efetividade do sistema mucociliar e diminuição da função de proteção do surfactante na região alveolar.

Caso Clínico



Bezerro fêmea, da raça Holandês, com 4 meses de idade, em semi-confinamento começou apresentar tosse úmida e dolorosa, expiração rápida e superficial, secreção nasal. No exame clínico, observou-se áreas de crepitações pulmonares, taquicardia, anorexia e relutância para erguer-se do solo.

Realizado lavagem broncoalveolar;

Que alterações verificaríamos nesse exame??





**Obrigada
pela
atenção**

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