

Diseases and the Causes of Mortality of Veal Calves in the Netherlands

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In most cases Dutch veal calf rearers are working in integrated systems with calf dealers, slaughterers and feedstuffs manufacturers.

In the Denkavit integrated organisation the farmers are obliged to send a form immediately to us for each calf that dies. On this form are recorded the age of the calves and the cause of death, or what the Veterinarian or farmer thought was the cause of the mortality.

That is the reason why the percentages which are mentioned below are not exactly correct.

In 1977 the Denkavit integrated producer organisation recorded losses of 2.96%.

However, the mortality in 1978 was about 3.5%.

From July until December, 1978 the causes of mortality were:

	Total	1 month	1-2 months	2-3 months	more than 3 months
E. coli	9.2	9.2			
Scour-enteritis	14.5	11.5	1.2	0.8	1.0
Salmonellosis	24.9	12.7	5.6	2.7	3.9
Furazolidon intox.	3.3	3.3			
Alimentary Hyperkeratose	1.2	0.1		0.4	0.7
Bloat	7.0	1.9	1.5	1.4	2.2
Colic	0.2	0.1			0.1
Abomasum ulcers	1.7	0.3	0.1		1.3
	<u>62.0</u>				
Respiratory diseases	8.5	3.3	1.0	1.0	3.2
Hyperthermia	0.5			0.1	0.4
	<u>9.0</u>				
Omphalitis	1.8	1.1	0.6		0.1
Arthritis	0.9	0.1	0.3	0.1	0.4
Tetanus	0.2	0.2			
	<u>2.9</u>				
Accidents	4.1	2.2	0.5	0.3	1.1
Acrodermatitis	0.3	0.2		0.1	
Aujeszky	0.1				0.1
Encephalitis	0.6	0.3	0.3		
Unkown	21.0	5.9	3.9	2.6	8.6
Total	100.0%	52.4%	15.0%	9.5%	23.1%

E. coli

Often in the first 3 days after arrival in the veal calf unit a small number of the calves show symptoms of *E. coli* septicaemia.

At the autopsy *E. coli* 078 K80 is often found in all organs. I have never seen this disease as a group disease.

During the first 1½ weeks individual calves show symptoms of *E. coli* enterotoxigenic.

Bacteriological examination of the organs is negative, but from the intestine *E. coli* K99 is often found.

Treatment of both types of *coli bacillois*: antibiotics and prevention or treatment of the dehydration with electrolyte solutions or NaHCO₃ solutions intravenously followed by e.g. NaCl solution intravenously.

Antibiogram:

	<i>E. coli</i> (078 K80)	<i>E. coli</i> (K99)
number of strains	66	27
streptomycine	68%	48%
chloramphenicol	9%	18%
tetracycline	2%	0%
neomycine	41%	48%
ampicilline	20%	25%
polymixine	100%	100%
spectomycine	85%	81%
furazolidon	86%	81%
sulpha	0%	0%
trivetrin	20%	1%

These are the results from calves isolated strains in 1978 by the Gezondheidsdienst voor Dieren Gelderland (Overgoor a. o.).

Between the 5th and the 10th day normally 10-30% of the calves have the so called "adaptation scour" caused by Rota and Corona viruses and coliforms.

Only electrolyte solutions instead of milk replacers for one day is sufficient to correct this problem.

Salmonellosis

Two types of *Salmonellae* were seen the last years in Western Europe and were the cause of severe problems and high mortality, especially in young veal calves.

In 1973 and 1974 *S. typhimurium* infections caused high mortality in many veal calf farms.

From 1976 till 1978 *S. dublin* infections were in many veal calf farms, but the mortality in those infected farms usually was between 5 and 15% (between arrival of the calves in the veal unit and delivery to the slaughterers about 21 weeks later).

During the cold winter of 1979 we seldom had outbreaks of salmonellosis.

S. typhimurium

Usually this disease starts among calves of one week of age.

The group becomes quiet, calves have high body temperatures.

After two days many calves scour, slimy or watery often with blood and fibrin in it.

The morbidity is about 90% and depending on the moment of treatment and the choice of the antibiotic, the mortality rate can be 50%.

Autopsy: enteritis with ulcers and necrosis.

Usually we advise a treatment of all calves: 3 or 4 days furazolidon followed by 7 days trimethoprim-sulfa combined with nifurprazine.

Individual calves are injected with neomycin solutions. Antibiograms show in vitro normally good reactions for neomycin, polymixin, furazolidon and trivetrin. The reactions for chloramphenicol, tetracycline and sulfa usually are negative.

The reaction of *Salmonella* in vitro seems to be good for polymixin, however treatment of calves with salmonellosis with polymixin is disappointing.

S. dublin

In calves of 2-4 weeks old infected by *Salmonella dublin*, scour is not the most striking symptom, but the affection of the respiratory tract.

I expect the viruses like P13 and B.V.D., are the cause of an immunodepression after which the *S. dublin* bacteria get their chance to cause a septicaemia followed by severe pneumonias and hepatitis.

In infected veal calf units, especially in the beginning of the infection, there can be a great variety in symptoms in calves of the same age group: calves with just dirty noses, calves with high breathing frequency, wet coat and fever and calves with a shoddy dull coat.

Bacteriological examination of the faeces is often negative.

In autopsy there is often a pleuritis and severe pneumonia and hepatitis (Ledschbor liver).

Antibiograms show in vitro good reactions to neomycine, polymixin, furazolidon and trivetrin.

Even with a long treatment e.g. 14 days trimethoprim-sulfa combined with nifurprazine, a small number of calves never reach the usual growth and feed conversion.

Veal calves can be affected by all the virus infections of grown cattle. Only two of these diseases will be discussed:

1. A disease of the respiratory organs and the mucous membranes of the mouth and eyes of young calves, which have been in the veal unit for 2 to 4 weeks.
2. A disease of the respiratory tract of older calves, appearing just before slaughter.

Main symptoms: coughing.

1) Disease of the respiratory organs of young calves

After 2 to 4 weeks in the unit the group is (too) quiet, some calves are coughing.

The calves have a conjunctivitis, red watering eyes, a salivary flow, they won't drink the milk and have a slight temperature.

Some calves are vomiting and a number of calves show difficulty in breathing, lose weight and have a slimy

purulent nasal flow.

Often the calves have one or more lesions on the nose, which becomes crusty later.

An investigation into this syndrome has been completed. Blood samples were taken at 23 infected units. Nasal mucus was collected with swabs. After 3 weeks blood samples were taken again from the same calves.

By cultivating the virus on the kidney cell cultures of cattle foetus and by the investigation of the development of antibodies in the blood of the calves the causal virus can be determined.

The results were: in about 40% of the cases I.B.R. virus was the main causative agent, in 30% of the cases B.V.D. P.I.3 was often found. In some farms R.S.B., B.A.d.V4 and Reo virus were also found.

Prognosis

The morbidity can be very high (up to 90%), the mortality low (0-5%). If the IBR virus is the main cause, the symptoms are more serious: refusal of the milk, difficulty in breathing, high temperature. In a unit the outbreak of the disease takes place after 2-4 weeks. In some calves the effects of the disease may last longer than 2 or 3 days. Calves with just a dirty nose recover easily. Complications are caused by Pasteurella infections. That is why we administer an antibiotic treatment for badly infected units.

Antibiogram (1978 Gezondheidsdiensten Gelderland en N.-Brabant):

	Past. haemolytica (105 strains)	Past. multocida (96 strains)
Penicilline	49%	86%
Streptomycine	33%	65%
Tetracycline	52%	78%
Chloramphenicol	98%	97%
Sulfa	62%	58%
Trimethoprim-sulfa	85%	91%
Ampicilline	85%	93%
Neomycine	93%	91%

The most common treatment is for calves of about 40 kg 1.5 gram chlortetracycline per calf per day during 10 days or 1.5 gram chloramphenicol palmitate per calf per day during 5 days.

1 gram Aspirin per calf per day during the first 3 days helps to cure.

2) Disease of the respiratory tract of older calves

There are many causes:

The viruses:	R.S.B. (allergy)	P.I.3
I.B.R.		
B.V.D.	B.ad.V4	(the most important)

The bacteria: Pasteurellae spp.

Outbreaks of the respiratory problems are caused by many factors:

- a) Too great a change of temperature between day and night (more than 5°C)
- b) A too high relative humidity (higher than 80%).
- c) Draught in the boxes.
- d) Too small air volume of the unit (less than 8 m3 per calf).
- e) Insufficient ventilation.
- f) Closed fronts of the pens.
- g) Too many calves in one unit (more than 50 calves in one unit).
- h) No providing each calf with its own bucket.
- i) Insufficient insulation of the walls and roof.
- j) Too long units.

This is why this disease mostly breaks out during Autumn (factors a and b).

Therapy

Correction of the zootechnic failures.
Sometimes heating of the unit will be necessary.

Drugs

- Tetracycline
- Sulfadimidine Na
- Chloramphenicol (leaves no residue after 15 hours)
- Expectorants

Problems of Therapy

The largest proportion of the veal calf farmers in the Netherlands have a calfhousing with a capacity of 200 or more calves. These calfhousings normally are divided in compartments of about 50 boxes. In many cases all calves at one farm are about the same age.

All calves are fed twice daily with a solution/emulsion of milk replacer in water.

In case of an infectious disease in a veal calf farm, the veterinary surgeon often decides to treat all the calves. Normally the drug is given via the milk.

The antibiotic that is used must:

1. be soluble (Furazolidon is not).
2. not be inactivated by component of the milk (Ampicilline forms complexes with Ca⁺⁺).
3. give a certain blood level in the calf (for treatment of a septicaemia or bacterial infections of the respiratory tract, of course not in case of an infectious enteritis).

Which antibiotic is chosen depends on the antibiogram, the 3 factors mentioned above and, last but not least, the results of the treatments in the past.

Furazolidon Intoxication

Furazolidon is a drug that can be very useful to treat a *S. typhimurium* enteritis, but Furazolidon is very toxic and not soluble in water (or milk). In 1978 in the Dutch Denkvit Organisation we had 4 Furazolidon intoxications with mortality rates between 20 and 60%, due to prescriptions of 10 times the maximum dosage.

Normally the Furazolidon (not the extra micronised

Furazolidon) dosage is:

during 3 days 20 mg per body weight per day divided in 2 feedings;

or day 1: 20 mg per kg body weight per day divided in 2 feedings;

day 2: 15 mg per kg body weight per day divided in 2 feedings;

day 3 and 4: 10 mg per kg body weight per day divided in 2 feedings.

If Furazolidon is added to the milk, the mixer should be left to turn until all milk has been drained into the buckets from which the calves will be drinking.

If the drug manufacturer gives other instructions, his instructions have to be followed.

If the extra micronised Furazolidon is used the above mentioned dosage is too high.

The use of D.M.S.O. (dimethylsulphoxide) together with Furazolidon makes the Furazolidon about four times as toxic.

Acute Furazolidon Poisoning

In case of an overdosage of Furazolidon calves have acute nervous excitation symptoms and depending on the level of over overdosage some calves can survive but are not reaching the growth level and feed conversion we are used to.

Chronic Furazolidon Poisoning

If a normal treatment (e.g. 3 days 20 mg or less per kg body weight per day) was repeated after several weeks, we saw several times some calves some weeks after the last treatment with long bleedings, nose bleedings or blood in the faeces.

In autopsy one can find haemorrhagic diathesis, or just a myocardial bleeding.

Generally after an antibiotic therapy like chloramphenicol, trimethoprim-sulpha, chlor- or oxytetracycline or sulphadimidine-Na an extra treatment with iron, trace elements and vit. B complex must follow to avoid a too serious anaemia (especially after chloramphenicol and trimethoprim-sulpha).