

# A Review of the Hypocalcaemia Contributions given at the 11<sup>th</sup> ICPD

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## Introduction

Parturient hypocalcaemia, and its clinical manifestation Milk Fever (paralysis puerperalis) is still one of the most important diseases in cattle production medicine. Judged by the number of contributions given, it also continues to be one of the cornerstones of this conference despite the fact, that a satellite meeting was organised

by this university specifically on the subject (Abildgaard Symposium: *Hypocalcaemia, acidosis and calcium homeostasis*).

It appears from Table 1, that 10 contributions were identified. In the table, these are grouped by the present author according to their most important keywords.

Table 1. An overview of hypocalcaemia-related contributions at the 11th ICPD, Copenhagen, August 2001.

Author	Country	Grouping
Roche, J. R. et al.	New Zealand	Aetiology: K <sup>+</sup> ; DCAD
Kojouri, GH. A.	Iran	Aetiology: Hypo-P
Sevinc, M, Aslan, V.	Turkey	Aetiology: Fatty liver
Sakha, M., Jamshidian, M.	Iran	Aetiology: Alfalfa hay
Hara, S. et al.	Japan / Denmark	Pathogenesis: G. I. motility
Ametaj, B. N. et al.	USA	Pathogenesis: Acute phase response
Hindhede, J. et al.	Denmark	Control: Strategies applied
Agger, N.	Denmark	Control: Oral Ca drenching
Horst, R. L. et al.	USA / Argentina	Control: Solanum glaucophyllum
Wilson, G. F.	New Zealand	Control: Diet Ca binding

## Commentaries to contributions

*Roche et al.* (New Zealand)

The study of Roche et al. was performed in a pasture based milk production system in New Zealand. This study may be characterised as frontline aetiology in the middle of the battle on the relative role of risk factors. In short they found no effect of ration K<sup>+</sup> before day 2 pp

whereas after day 2 a positive effect of K<sup>+</sup> was recorded. This contrasts with findings from USA, possibly because of the often comparatively much higher level of K<sup>+</sup> found in US forage. On the other hand, the positive response observed after day 2 needs an explanation.

Could it perhaps be a non-significant, and therefore hidden, effect around calving? Obviously this paper points at the need for more trials to unravel the complex interaction between dietary ions and parturient hypocalcaemia.

*Kojouri GH A (Iran)*

This study confirmed that milk fever cases are most often hypophosphataemic and often hypomagnesaemic.

Pretreatment hypophosphataemia was judged to be more pronounced than the hypocalcaemia. The question on how to conclude on this was raised. Kojouri concluded that hypo-P was most important and recommended that P was included in standard treatments. But can we conclude that? What happened to the hypo-P when the hypo-Ca was corrected after treatment with standard calcium infusion? Normally hypo-P will normalise in response to intravenous Ca infusion.

*Sevinc M & Aslan V (Turkey)*

Fatty liver was found to be associated with MF. Since fatty liver does not develop from day-to-day, it may be concluded that this presentation point at fatty liver as a factor which should be added to the list of milk fever risk factors, and that is a significant and important finding.

*Sakha M & Jamshidian M (Iran)*

The authors had investigated a regional milk fever problem, occurring among 18% of the dairy cows. Many factors were recorded and analysed in an attempt to identify most important risk factors. They found pure alfalfa hay feeding to be one such factor. This was explained as being caused by a high Ca intake. It may be added, that usually a high intake of K<sup>+</sup> result from such feeding, and this factor should

therefore also be considered although the importance of this particular ion has been questioned by for instance J. Roche (above).

*Hara S et al. (Japan / Denmark)*

Like we already know for the rumen that hypocalcaemia result in a pronounced motility reduction, this study expands further down the gastro-intestinal tract, finding significant, but less pronounced motility reduction here. As with the rumen effect, reductions take place before the classical clinical signs of milk fever have developed. These results are very valuable in explaining non-specific early signs like coproptosis. The effect recorded on the abomasum are particularly interesting with regard to the relative role of hypocalcaemia towards displaced abomasum.

*Ametaj BN et al. (USA)*

The acute phase response was followed in blood samples taken from cases of milk fever. Among the parameters studied, serum amyloid A and GRP (non-significant) analyses were a hit. The study is probably a first attempt to study acute phase parameters in relation to milk fever and the significance of these results are not easy to work out. However, such new applications can probably give food for thought for combined groups of specialists particularly working with acute phase response, and those working with hypocalcaemia aetiology.

*Hindhede J et al. (Denmark)*

This was a combined survey / poll on actual control strategies applied on large Danish dairy farms.

Probably the most important facts recorded were a confirmation that oral Ca drenching dominated, with 71%, followed by attempts to

feed low calcium rations, while only 8% had attempted to work with the Ca/P-ratio of the ration. Practically none had attempted to reduce dietary CDAD.

I agree with the authors on the expected low success-rate of the attempts to reduce ration calcium. Practical possibilities are simply not getting it low enough.

I also agree with the authors, that their paper provides valuable information for modelling control strategy options. It may be added that the results are also valuable information, as they are, for herd advisors, and for sellers of milk fever related products.

#### *Agger N (Denmark)*

The preventive value of oral calcium supplementation was investigated utilising an intelligently designed strategy applying a calcium chloride product at first signs of calving, followed by drenchings containing calcium propionate in propylene glycol. As such the paper is in the frontline of oral calcium drenching. Agger found a 50% reduction in hypocalcaemia from 3 drenchings vs untreated controls, which is similar in magnitude to what can be expected from the recommended standard program comprising 4 doses. The limit used to distinguish between hypocalcaemia and normocalcaemia of 1.5 mmol/l does seem a bit low, but when asked the author claimed that the findings did not differ substantially if data analyses was done based on a higher threshold value.

An additional benefit of this programme was that a negative feed-back on blood calcium some time after treatment, a drawback often seen with the standard drenching program, was not recorded.

#### *Horst RL et al. (USA / Argentina)*

The plant *Solanum glaucophyllum*, belonging

to the potato-tomato family, grows in part of Argentina. It has a powerful vitamin D-like effect when ingested in small quantities. This study is a third attempt to utilise its action in milk fever control, and in this case results were very promising. A not necessarily negative side effect was recorded: Blood phosphorus was enhanced, probably due to increased availability of dietary phosphorus.

As with all promising new approaches to control, there will be a lot of unanswered questions: Can it be transformed into a safe on-farm product or strategy? In other words, is it too powerful to put into the hands of the average dairy cow manager? Are there any chance of negative side-effects coming up? Horst answered this by explaining that non-parturient cases of hypocalcaemia may appear 3 weeks pp ("lactational milk fever"), but that this was avoided when a phased withdrawal was applied.

In conclusion, this is an interesting study with an interesting perspective.

#### *Wilson GF (New Zealand)*

Dr. Wilson reported on a novel principle for milk fever prevention based on an attempt to stimulate calcium absorption before parturition. The product used was based on vegetable oil, which was thought to act by binding ration calcium by soap formation. Wilson claimed a reduction in milk fever to one third (66% efficiency) which is high compared to that obtained by other preventive systems. Additional claimed benefits were increased milk solids and a reduction in the retained placenta incidence rate.

There were many questions after the oral presentation, in particular to the content of the product. Wilson explained, that the product now also contained bentonite in the order of 100g/kg, and insoluble phosphorus salts. Another question was related to situations where a

high calcium diet was fed. Wilson replied, that magnesium supplementation should probably be considered.

In conclusion this paper obviously has an inter-

esting perspective. No doubt we will see a new generation of solutions based on the novel principle of reducing dry cow ration calcium availability one way or the other.

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