Panel Discussion

Feedlot, Dairy-Cow/Calf
Combined Session (Miller, Gyles, Butler and Acres)

Question: Can cows be vaccinated for IBR, BVD during the last two months of gestation safely and efficaciously? Does the calf develop an active immunity from the vaccination?

Answer: During various stages of gestation the virus does not produce abortion and by that you would have to test the virus by injecting it into the fetus. The virus would have to have been previously tested to see if it would produce abortion. Now this has been done certainly with the nasalgen, the nasal application vaccine and it does not and it apparently does not revert and if the fetus actually does seroconvert to the vaccine I can't say about any of the BVD vaccines.

Question: How does BVD cause early embryonic death, particularly during the first 40 days?

Answer: It has been demonstrated that when they superovulated animals and they put the virus into one part of the uterus and not into the other part and then recovered the embryo shortly afterwards, that the embryos are infected with the BVD virus and in fact they are dying. So, that is one way that they can do it. I would think that also that the virus may have an effect on the uterine endothelium and then would interfere with the implantation and affect it during the 45 day level.

Question: Please comment on abortions associated specifically with low energy diet. Does it affect implantation or does it cause abortions and stillbirths?

Answer: I am not really equipped to comment on that other than any work that I have read on this and I have not read extensively on this subject, I don't think that low energy diets will interfere with implantation. And also I don't think that low energy diets are a factor in abortion later on unless apparently there is a very sudden drop in the level of energy that is being supplied and then sometimes it is a factor. I think that starvation and so on are more important in the death of the animal and that the abortion there just heralds the demise of the animal.

Question: Dr. Miller again, What degree of acidosis is required to induce fetal death and/or abortion, the question in particular reference to grain overloads, severe grain overloads in pregnant cows. If we successfully treat the grain overloads, stomach acidosis, can abortion occur a week or ten days later?

Answer: I think that the abortion would probably occur earlier than that. If you associate it with a low pH, I can't give you figures on that because I am not aware of any work that has been done on that. I do know that in acidosis there is some work in lambs that has been done where they have produced an acidosis and they produced abortion but usually it occurs earlier than that, usually during the first week.

Question: Dr. Butler: We all realize that the commercial products available to treat diarrhea in calves are most ideal, what about home remedies that would be an acceptable substitute, salt or sugar solutions, protein sources? For example, an owner calls from 50 miles away at 10:30 p.m. on a Saturday night for a 10% dehydrated calf, what do you recommend when his medicine chest is empty?

Answer: In terms of rapid correction of the acidosis this severely dehydrated calf may have, tell him to get out the wife's tablespoon measure and four level tablespoons of baking soda in a quart of water will give you that hypertonic solution of sodium bicarb, that I mentioned, 5% sodium bicarb, that can in small volumes be administered orally. You would be better off to use one level tablespoon into a quart of water, that is an isotonic sodium bicarbonate solution that can be suckled or fed to the calf, that could be combined with a level teaspoon of normal table salt, sodium chloride and again in a quart of water. That will give you that isotonic sodium chloride solution so that combination could be fed. Again, it can be suckled, it should be taken up quite readily and be quite effective. In terms of carbohydrate sources, most people do not have on hand dextrose solution. You do not want to use table sugar. Table sugar is sucrose, the neonatal calf cannot digest sucrose, he has no sucrase activity in his gut, experimentally I can reproduce diarrhea with table sugar in sufficient quantities to a neonatal calf. What is the available substitute—corn syrup is not very good but it is partially absorbable and it certainly will not worsen the situation so two or three tablespoons of this material added to that previous mixture of normal salt and your sodium bicarb will give a little bit of carbohydrate and hopefully stimulate absorption.

Question: Doctor, in relation to that comment, we have seen a controversy whether the sodium bicarbonate in the antidote antacid is as effective as leaving the acid gut to counteract E. coli. Some people say we should not use bicarbonate because we are overcoming the natural acid effect on the E. coli.

Answer: I think that if you were talking in terms of prevention, that would be very important because your point is good. The alkaline sodium bicarbonate would raise the pH in the stomach and probably facilitate the passage of pathogens and other organisms into the proximal small bowel. If they are the right ones they can colonize, multiply, and produce disease. If you are talking about the animal that is already suffering from the disease, what is going to kill that animal is the acidosis from dehydration and I think that it is worth the risk there but get that neutralization of the extra cellular fluid to replace that lost salt and facilitate the absorption of water.

Question: Question for Dr. Butler: Calves which we have felt clinically should have responded to treatment for neonatal diarrhea, but in fact go on to die, can be regarded as a treatment failure. What are some of the common causes of treatment failures in these cases? Supplementary to that, how important is the commonly diagnosed meningitis as a cause of treatment failure?

Answer: I would have to say that as far as the commonest cause for treatment failure, provided treatment has been adequate in terms of volume and so on, that the animal is not in fact dying of dehydration, acidosis, and electrolyte imbalance. Given that those factors are corrected but the calf still goes on to die, then I think that most commonly we are getting into much more severe pathogenic and morphological damage to the gut in infectious such as salmonella. That has got to be one of the most common reasons for it, where we are not dealing strictly with functional upset, you have a functional upset but in addition to that, gross damage to the bowel wall.

To the second question on meningitis, I think that it is a relatively low cause of treatment failure but I think that it is something that we should recognize and the point that I was trying to make this morning was don't be put off on fluid therapy, particularly intravenous fluid therapy, because you have had an animal die showing nervous signs and someone says well that is because you over-hydrated. I think that in the vast majority of cases it does not happen, but in those few cases, in the majority of those few cases, it is an underlying septicemia and localization in the nervous tissue, prior to ever touching that animal's fluids.

Question: Doctor Butler, would you comment on your experiences with severely dehydrated calves once you begin the IV infusion, they go into convulsion and die? At necropsy we do not find meningitis, we wonder about some other causes, and this is not rare.

Answer: I must admit that in my own experience, it is a relatively rare phenomenon. I don't know if it is related to the situation that you have an animal in gross electrolyte imbalance before you ever start. I doubt that because that is easily recognizable in these calves, particularly the hypercalemia, you get an irregular heart with these animals, it should be very easily picked up. We do see a few of these animals that we can't explain it but they are extremely hypoglycemic and again, they are not particularly responsive and this may be a factor, but other than that I really cannot suggest.

Question: I would like to know if there is any information on the environment as far as liming is concerned and raising the pH which supposedly is more favorable for salmonella?

Answer: Dr. Acres: I don't really want to comment on that one.

Question: Another question for Dr. Miller: What about the use of intranasal IBR vaccine? Apparently it only causes a local reaction in the nasal passages. What about the use of it in pregnant cows?

Answer: For the prevention of previously unexposed animals? Yes. I think that this would be very useful because most of the IBR abortions come through the respiratory tract, they do not come through the reproductive tract.

Question: I would like to ask Dr. Acres if Vicogen is just a simple bacterin or if it is prepared somehow with the K99 antigen so that it is better than just, lets say, a bacterin that you could make or one you could mix up from the fellow's own *E. coli* on his farm. We tried it on a couple of herds and are wondering if we should try the Vicogen since we are not having the best success the other way.

Answer: I think autogenous bacterins can be useful in a herd if you get the right organism. I think that the thing about Vicogen is that it is made with a strain of *E. coli* which has a high K99 production and it is also grown and cultured in a way that K99 expression is maximized so that there is a quantitative question here, you have to get a certain level of the K99 antibody I think before you will get protection. The way that bacteria are traditionally grown in broth, I think, often leads to a decrease or in fact no K99 production so you could take a K99 strain, make an autogenous bacterin by traditional methods that you might use in a practice and in fact not have K99 expressed and therefore not get any K99 antibody to bacterin.

Question: Question for Dr. Gyles: Given the importance of the identification of serotypes in diarrheic calves, and more particularly entrotoxins of which you spoke this morning, what about the use of the traditional fecal swabs on culturing on blood McConkeys in a bovine practice as a aid in the diagnosis of *E. coli* diarrhea in calves and drug sensitivity.

Answer: Well, one does simply a routine culture in blood and McConkey's agar, it does not really help you because you have no new information, you could predict before you did that, that you were going to get large numbers of *E. coli* and you really have no new information simply by growing them on the blood and McConkey's agar. So, you would not be getting any laboratory aids. You might be basing your diagnosis on a clinical impression but it is not helpful in the diagnosis. The antibiotic susceptibility may be of some value if indeed that *E. coli* is indopathogenic and if you bear in mind that although it may be of some value it is not the primary approach to treatment as Dr. Butler indicated.

Question: Question for Dr. Miller: How do you know when there is fetal retardation in utero?

Answer: I think that it is very difficult to know unless you see gross abnormalities and, what I mean by that is, an animal that by all other indications, that is hair growth development shows that it is of a certain age and then by other measurements it is below the average size in various areas than you would expect for that age. This has been done with bovine virus diarrhea by Dr. Done in England. There he did measure and he did weight measures and he did biochemical measures of brain, he measured tibias, the mass of gastronemius muscles and he measured thymus and he found all of these areas markedly reduced by this virus. To recognize it grossly, yes you might, like the one that I photographed there, obviously it is suffering from intrauterine growth retardation. But some of the others, I think they have been around but we have not been able to recognize them.

Question: Dr. Butler: Question regarding your practice tip last night, you talked about the use of magnesium oxide and magnesium sulfate for cathartics in bovine practice, how does the use of sodium bicarbonate compare to the use of magnesium hydroxide and magnesium sulfate for the treatment of grain overload?

Answer: I think that the basic difference there is the severity or the ability of those two chemicals, when you compare sodium bicarbonate and mag. oxide and mag. hydroxide as far as neutralizing acid. It is not nearly as strong a base, sodium bicarbonate is not, therefore it is not going to be nearly as effective in the quantity of acid that it could neutralize. You would have to give far larger quantities of it than you would have to give of mag. oxide or mag. hydroxide in order to neutralize the same about of base. So, in severe cases of grain overload, it is not the drug of choice. As far as a cathartic is concerned, it is not considered a cathartic in that it is absorbed, it is readily absorbed and therefore it will not stimulate defecation from that standpoint.

Question: Dr. Miller: Has xylathene or Rompun been implicated in abortion or premature deliveries in pregnant cows?

Answer: I don't know the answer to that, I'm sorry.

Moderator: Has anyone had any experiencing in using xylathene in pregnant cows and causing abortion or premature delivery? No answer.

From the floor: I have difficulty reconciling, vaccinating cows with BVD vaccination from what we have heard last night and today. Particularly in the cow in the last trimester of pregnancy, and I would like to call your attention to some work that was published in the proceedings of the Biological Sciences in Budapest, Hungary, by Dr. Wagner, they vaccinated several thousand head of cows with the Oregon C24 V strain of BVD vaccine in the last trimester and they found that about 70% of the calves would develop active immunity to BVD, and by that we are talking about measuring titers to BVD before nursing and that the other 30% their dams are boostered extensively so that when they do nurse they, through passive immunity, develop titers as high as 1 to 5,600. Secondly, they have not experienced any abortions due to BVD in the last trimester and as far as any side effects they have not been able to label any of them as related to BVD. Thirdly, in our practice, we have done some work along this line where we have had enteric disease related to BVD and have been able to consistently control BVD enteric disease by vaccinating the cow in the last trimester and we have used either the Singer or the NADL strain of BVD vaccine and have experience no abortions due to BVD.

Dr. Miller: I think that you have to use it according to your local conditions, however, I would caution you that I don't know whether this particular virus does cause lesions in the fetus in utero but in Dr. Done's work and several others who I am quoting, these animals injected at 100 days did have, and even those that developed antibody titers did show intrauterine growth retardation. This would not be something that you would observe grossly in these animals but it might be very important as far as the marketing of meat later on, which you would get a reduction in gastrocnemius. However, this is better than having them abort or get diarrhea.

Comment from the Audience: In regard to the herd that we reported on last night in Mr. Ernst's presentation, prior to deciding to go for calfhood vaccination on that herd, we did randomly select a representative number of the cows and we bled them three weeks apart, two occasions, immediate in the last third of pregnancy, just to look at what the antibody titers were like, - Sort of like in the average cow in that herd. We found quite adequate, what would have been described in the literature as protective titers in the cows to BVD, so there did not seem to be any point in trying to further boost the immunity in the cow because it seemed as is indicated in the literature, that the problem was associated with weaning passive immunity in the calves. That was the reason that we went with calfhood vaccination since the calves were developing the disease relatively early, we were quite radical in introducing the vaccination at six weeks of age and we were anticipating that probably that first vaccination would do nothing for the calves, that it would be neutralized, or any effect as far as stimulating active immunity is concerned. In spite of that, we still had deaths so that in that particular herd, and this is not a common situation, I know a few herds like this, but in that particular situation, there seemed to be active immunity in the cows, they were passing it to the calves in the colostrum and it's in the transitition period that we are having problems.

Answer: We were not concerned so much about boostering the cows as the fact that 70% of these calves were developing active immunity rather than passive immunity. Also in this work by Wagner, he has been able to demonstrate that even though these calves that do not develop active immunity, they do have passive immunity, this early vaccination may have demonstrated on several thousand head that they seem to develop an anamnestic response where the first vaccination given early, with a calf with passive immunity, does not develop an active titer but on subsequent

vaccination, he achieves a titer much quicker than would have been if he had not been vaccinated.

Comment: 70-90% of the cattle already have BVD virus neutralizing antibodies, then if you vaccinate these cows when they are pregnant, they will not produce active immunization in the calf.

Dr. Miller, any comment on that? I think that if the cow does have an immunity already, and she is vaccinated, it is unlikely that the fetus will develop an immunity because the live virus probably won't travel to the fetus.

Answer: In dealing with the *E. Coli,* scours in calves, it was sort of a negative feeling with oral treatment with antibiotics, I was just wondering, with the elimination of normal gut flora, do you propose the commercial lactabacillus preparations or yogart something like this along with therapy or is it effective, would you use it instead of oral antibiotics?

Answer: Certainly I think that my experience is probably reflected by many people here, I may be wrong. My experience with the oral lactobacillus is that it does not produce any clinical response, it does not seem to do the job. Theoretically it should work well but in practical experience it does not. At this point I really cannot add too much more to that. All I know is under our limited experimental conditions where we produce a specific type of enterpathogenic *E. coli* infection with an organism that we know we can specifically identify that organism and we know its specific sensitivity, if I administer antibiotics orally, one dose of antibiotics orally to that animal, I can eliminate that pathogen virtually from the intestine, so it is very effective. The problem is that (1) do you know that it is just *E. coli* causing the problem? (2) can you be sure of the sensitivity, this is where the problem arises because I think that you do produce tremendous disturbances in the normal gut flora and if you eliminate that normal flora, you leave that much more substrate for your pathogen to multiply and so on.

Question: How about the re-establishment of normal gut flora with the lactibacillus or yogart?

Answer: We don't seem to be able to do it, but maybe someone else will be able to comment on that.

Answer: It is actually very difficult to establish the lactobacillus rapidly and effectively in the gut from these commercial preparations because all of the organisms have to be freeze dried. It takes a long time for them to get going again in the gut and even if they get going it is often not in very large numbers, so at a practical level, if you could get them established, to produce acidity, it would be effective. We often don't get them well established.