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Treatments

To Be Used For

Swine Enteritis

Joseph Blake, Ph.D.

Several etiological factors may be involved in enteritises of swine. The pathology may result from the presence of any one or from a combination of these factors. Of the microorganisms etiologically involved, or at least predisposing, *Salmonella choleraesuis* is probably most common; however, both viruses and Vi rio species can predispose. Predisposition due to the added stress accompanying nutritional deficiencies is perhaps more important than any microbial species which has been incriminated, and in many cases of porcine enteric disorders a history of nutritional error exists. Inasmuch as swine enteritises may be either (or both) infectious or non-infectious, therapy should include specific medication and, in addition, instruction in correct management and feeding practices. Undoubtedly the more successful practitioners employ such an armamentarium rather than relying solely upon the so-called “wonder drugs.”

Dietary Factors

Reference has been made in the literature to vitamin A (2) and the B-complex vitamins (15) as predisposing to intestinal inflammation and infection in swine receiving inadequate daily levels of these vitamins. Thorp (15) obtained 86% recovery of 8 swine suffering from severe cases of enteritis by administering large quantities of a mixture of the B vitamins via the ration and by intraperitoneal injection of massive doses, no medicinal agents being employed. Cameron (4) concurs with Thorp as to the value of supplemental feeding of vitamins, especially A and B-complex, in reducing both incidence and severity of enteritis. An adjunct to vitamin therapy is the reduction of ration allowance during an outbreak of swine enteritis (4,6). In addition to reducing the ration quantitatively, ration composition modifications may have supportive value. A bland diet should be fed during the course of the disease and for a short time following relief of clinical symptoms. Any dietary change should be introduced gradually with transitional feeding periods, both when introducing the special diet and when returning the swine to the regular diet.

Quarantine and Sanitation

Additional wise precautions include quarantine and sanitation. Quarantine should be accomplished by leaving the diseased swine where they are and moving the sound individuals to new ground and buildings, rather than the reverse. This reduces exposure of the healthy individuals to pathological microorganisms which are being excreted by the sick an-
imals. Sanitation measures include cleaning the ground and equipment of infected feces, feed, and refuse, with subsequent disinfection of the general area before re-stocking with non-infected swine (6). Perhaps the most effective solution, if grade animals are involved and the pathological organisms are well seeded down, would be disposal of all infected and exposed animals, cleaning and disinfecting the premises and re-stocking with non-infected swine. Care should be taken to dispose of infected animals without spreading the pathological microorganisms beyond the environment already contaminated.

**Sulfas**

Davis, Hale, and Freeman (5) administered a culture of *Salmonella choleraesuis* to 36 swine and subsequently treated the developing cases of enteritis by administering sulfaguanidine, nicotinic acid, thiamine or pyridoxine. The thiamine and pyridoxine were of no apparent prophylactic or therapeutic value; however, the nicotinic acid expedited recovery. The sulfaguanidine was effective in protecting against an outbreak of the disease. Cameron (4) found sulfaguanidine to be effective at a dosage level of 1 gram per 20 pounds body weight when administered 4 times daily for a period of 5 days. Double this amount was needed in severe cases, and often a relapse would occur after 6 to 8 days. In this case resumption of treatment would eventually effect a cure. In Cameron’s experiment, conclusions should be made with reservation inasmuch as the number of experimental subjects was small and some individuals recovered with no treatment.

**Sulfathalidine** (phthalylsulfathiazole) has been employed experimentally by Boley et al. (3) and Edmonds (7, 8). However, results were at variance. Boley reported only 40 percent recovery when employing sulfathalidine to treat cases of dysentery wherein both *Vibrio coli* and *Salmonella choleraesuis* were isolated from the infected swine, whereas 44% recovery of control animals occurred. Neither was sulfamethazine greatly effective in the same experiment inasmuch as only 57% recovery occurred with individuals receiving this agent. Dosage levels of these 2 sulfonamides were 0.25% and 0.20% of the ration, respectively. Conversely, Edmonds reported 92.5% recovery with sulfathalidine administered in the feed at the rate of 2 to 4 grams daily for 2 to 4 days to 869 swine which had clinical cases of enteritis. However, Edmonds maintained no control groups in this experiment, therefore conclusions should be guarded. In a second trial Edmonds reported 88% recovery of 380 cases of an enteritis-pneumonia syndrome in swine between 2 to 10 months of age when treated with either sulfathalidine or sulfamerazine, as compared to 100% mortality in 26 untreated individuals. He recommended dosage levels of 3 grams daily per 85 to 100 pounds body weight in the case of sulfamerazine and 1 gram daily per 10 pounds body weight in the case of sulfathalidine, treatment being continued for several days in each case.

**Nitrofurazone**

Nitrofurazone has been recommended both by Lannek (12) and Gats (9) for treating swine enteritis. Lannek fed 0.1 gram of nitrofurazone twice daily to 160 swine and left 40 as controls. Subsequently all were exposed to *Salmonella choleraesuis*. None of the prophylactically treated animals contracted the disease, but 16 of the non-treated animals did. Subsequent treatment of these 16 individuals with nitrofurazone resulted in recovery. Gats found that nitrofurazone inhibited the rate of reduction of certain dyes by *Escherichia coli*, and he attributes the therapeutic effect of nitrofurazone to this mode of action.

**Bacitracin**

Bacitracin has been employed experimentally by Graham (1) and Rossoff (13). Graham reported bacitracin as having a marked therapeutic effect against necrotic enteritis, whereas sodium arsanilate was of slight value and sulfathalidine or sulfamethazine of no
Neither of the sulfanamides provided a recovery rate greater than that which occurred with control animals. The dosage rates employed by Graham were as follows: bacitracin, 50,000 or 100,000 units orally per day for 6 days; sodium arsanilate, 2.1 grains arsenic per gallon of water for 6 days; sulfathalidine, \( \frac{1}{4} \) pound per 100 pounds of feed for 8 days and sulfamethazine, \( \frac{1}{2} \) pound per 250 pounds of feed for 8 days. Rossoff reported on the merits of bacitracin for swine suffering from acute hemorrhagic dysentery, necrotic enteritis, infectious baby pig scours, post-vaccinal enteritis, non-specific enteritis following weaning, and enteritis of garbage-fed hogs. He reported bacitracin as being very satisfactory in regard to speed and degree of action, ease of administration, prevention of relapse, degree of toxicity and cost.

Others

Sodium arsanilate has found widespread use by veterinary practitioners for treating swine enteritis. Boley (3) reported 83% survival of swine suffering from swine dysentery wherein both \emph{Vibrio coli} and \emph{Salmonella choleraesuis} were isolated. He administered 2.1 grains of arsenic per gallon of drinking water. However, the surviving animals continued to show symptoms of unthriftiness and did not fully recover from the disease until bacitracin was employed.

Stress following swine vaccination often predisposes cases of enteritis. Edmonds (7) found that sulfathalidine, when prophylactically administered concurrent with vaccination, protected swine from any pending enteric infection. He suggested commencing sulfonamide prophylaxis one day prior to vaccination.

A degree of immunity results when sows recover from either natural or induced cases of transmissible gastroenteritis, and there is a transfer of immune bodies through the sow’s milk to nursing pigs (2). Josland (11), however, found the immunological response following vaccination for \emph{Salmonella choleraesuis} to be meager and inconsistent. From the results of challenge trials he concluded that prophylactic vaccination against this organism had little value.

Prior to the widespread use of sulfonamides, antibiotics and furazone compounds, many home remedies were employed in treating swine dysentery cases. Examples are numerous. One example is the treatment suggested by Doyle (6) wherein oats, soaked in a 2% salt brine, were fed to swine suffering from an enteric infection. Consumption of the medicated oats was encouraged by withholding all other feeds and providing water \emph{ad libitum}. Adjunct treatment by Doyle included oral forms of sodium bicarbonate and sodium chloride.

References Cited

12. Lannek, N. Hehandling av paratyfus has svin med nitrofurazone (Nitrofurazone in treatment of salmonellosis in pigs). Nord.
Dr. C. R. Collins, '28, Dixon, Ill., is a member of the Agriculture-Business Relations Committee of the Illinois State Chamber of Commerce.

Dr. A. W. Pennings, '43, recently was elected mayor of Minneota, Minn.

Dr. M. R. Beemer, '41, recently had one leg confined to a cast as a result of being injured while treating a steer. He is located at Corning, Iowa.

Dr. C. L. Bohan, '30, is now mayor of Madelia, Minn.

Dr. E. T. Anderson, '37, Tucson, Arizona, was featured in an Arizona newspaper for his prompt airborne response to the scene of a race-track fire which had gutted a stable and burned 20 horses. Doctor Anderson uses his airplane on such calls.

Dr. John W. Carey, '41, of West Liberty, Iowa, was appointed Town Veterinarian.

Dr. LeRoy T. Christensen has been located in Hancock, Minnesota, since graduation. A recent addition to his general practice is the Hancock Clinic, complete with office and medical facilities. Being very active in the community, Dr. Christensen has served as an active member or officer of a number of organizations including the school board, Community Chest, Commercial Club, Sportsman's Club, volunteer firemen, Saddle Club, Men's Club, Evangelical Lutheran Church, Masons, Shrine Club and Boy Scouts. He is past president and secretary of the Central Minnesota Veterinary Medical Association, past member of the Board of Trustees of the M.V.M.A. and is serving as a member of the Education and Civil Defense Committee. He was a member of the TV Committee for the A.V.M.A. Convention last summer.

DEATHS

Dr. R. M. Hoffer, '17, died in Cedar Rapids, Jan. 28, 1956 from a heart attack. He had served on both state and federal forces in disease control work and was employed by Corn States Laboratories at the time of his death.

Dr. Ralph Graham, '02, died Nov. 19, 1955. Dr. Graham had served with the U.S.D.A. Bureau of Animal Industry in Jefferson City, Mo. from 1918 until his retirement. He is survived by his widow and a son.

Dr. Archie L. O'Banion, '07, died Feb. 18, 1956. Dr. O'Banion served with the U.S.D.A. Bureau of Animal Industry on meat inspection and field work after receiving his D. V. M. degree. He became a field veterinarian and assistant state veterinarian of California, 1916-1920, and then operated a dairy for several years. He returned to state work prior to his retirement in 1952. Dr. O'Banion is survived by his widow.

Dr. H. B. Morris, '13, died Jan. 29, 1956 following a heart attack. Dr. Morris practiced in Keota, Iowa for 30 years.

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