DIETARY ABOMASAL IMPACTION IN CATTLE

 Dietary abomasal impaction occurs in cattle when the animals are fed poor-quality roughage. The disease is most common in pregnant beef cattle which increase their feed intake during extremely cold weather in an attempt to meet the increased needs of a higher metabolic rate. The disease has also occurred in feedlot cattle fed a variety of mixed rations containing chopped or ground roughage (straw; hay) and cereal grains and in late pregnant dairy cows on similar feeds.

ETIOLOGY AND EPIDEMIOLOGY

 The consumption of excessive quantities of poor-quality roughage which are low in both digestible protein and energy is the primary cause. Impaction of the

abomasum with sand can also occur in cattle if they are fed hay on sandy soils or

root crops that are sandy or dirty. Outbreaks of impaction with sand have

occurred in which up to 10% of cattle at risk were affected. The disease occurs most commonly in young pregnant beef cows that are kept outdoors year-round, including during the cold winter months, when they are fed roughages consisting of either grass or legume hay or cereal straw, which may or may not be supplemented with some grain.

 Impaction of the abomasum, omasum and rumen may occur because of the relative indigestibility of the roughage. Outbreaks may occur affecting up to 15% of all pregnant cattle on individual farms when the ambient temperature drops to -5 to –l0 C for several days.

 The ingestion of gravel (stones) by dairy cattle kept in dry-lot facilities can result in complete, non-strangulating intraluminal obstruction of the abomasum and duodenum. The gravel, consisting of sand and small stones, may be inadvertently mixed with the feed when it is being scraped from bunker silos. It is also possible that some cows may ingest the gravel through pica.

PATHOGENESIS

 Chopped roughage and finely ground feeds pass through the forestomachs of

ruminants more quickly than long roughage and perhaps in this situation

the combination of low digestibility and excessive intake leads to excessive

accumulation in the forestomachs and abomasum.

When large quantities of sand are ingested, the omasum, abomasum, large

intestine and cecum can become impacted. The sand that accumulates in the abomasum causes abomasal atony and chronic dilatation. Once impaction of the abomasum occurs, a state of subacute obstruction of the upper alimentary tract develops. The hydrogen and chloride ions are continually secreted into the abomasum in spite of the impaction and atony and an alkalosis with hypochloremia results.

 Varying degrees of dehydration occur because fluids are not moving beyond

the abomasum into the duodenum for absorption. Potassium ions are also

sequestered in the abomasum, resulting in a hypokalemia. Almost no ingesta

or fluids move beyond the pylorus, and dehydration, alkalosis, electrolyte

imbalance and progressive starvation occur. The impaction of the abomasum is

usually severe enough to cause permanent abomasal atony.

CLINICAL FINDINGS

 Complete anorexia, scant feces and moderate distension of the abdomen are

the usual presenting complaints given by the owner. The onset is usually slow and progressive over a period of several days. Cattle that have been affected for several days have lost considerable weight and are too weak to rise. The body temperature is usually normal but may be subnormal during cold weather, which

suggests that the specific dynamic action of the rumen is not sufficient to meet

the energy needs of basal metabolism. The heart rate varies from normal to

90-100/min and may increase to 120/min in advanced cases where alkalosis, hypochloremia and dehydration are marked.

 The respiratory rate is commonly increased and an expiratory grunt due to the

abdominal distension may be audible, especially in recumbent cattle. A mucoid

nasal discharge usually collects on the external nares and muzzle, which is

usually dry and cracking because of the failure of the animal to lick its nostrils and the effects of the dehydration.

 The rumen is usually static and full of dry rumen contents, or it may contain an

excessive quantity of fluid in those cattle that have been fed finely ground feed.

 Deep palpation and strong percussion of the right flank may elicit a 'grunt' and this is probably due to overdistension of the abomasum and stretching of its serosa. The course of the disease depends on the extent of the impaction when the animal is first examined and the severity of the acid-base and electrolyte imbalances. Severely affected cattle will die in 3-6 days after the onset of signs. Rupture of the abomasum has occurred in some cases and death from acute diffuse peritonitis and shock occurs precipitously in a few hours. In sand impaction, there is considerable weight loss, chronic diarrhea with sand in the feces, weakness, recumbency and death within a few weeks.

CLINICAL PATHOLOGY

 A metabolic alkalosis, hypochloremia, hypokalemia, hemoconcentration and a

total and differential leukocyte count within the normal range are common.

NECROPSY FINDINGS

 At necropsy the abomasum is commonly grossly enlarged to up to twice normal size and impacted with dry rumen-like contents. The omasum may be similarly enlarged and impacted with the same contents as in the abomasum. The rumen is usually grossly enlarged and filled with dry ruminal contents or ruminal fluid. The intestinal tract beyond the pylorus is characteristically empty and has a dry appearance. Varying degrees of dehydration and emaciation are also present. If rupture of the abomasum occurs, lesions of acute diffuse peritonitis are present. Abomasal tears, ulcers, and necrosis of the walls of the rumen, omasum or abomasum may occur.

 TREATMENT

 Salvage or treatment?

 The challenge in treatment is to be able to recognize the cases that will respond to treatment and those that will not and should therefore be slaughtered immediately for salvage. Those that have a severely impacted abomasum and are weak with a marked tachycardia (100-120/min) are poor treatment risks

and should be slaughtered. Rational treatment would appear to consist of

correcting the metabolic alkalosis, hypochloremia, hypokalemia and dehydration

and attempting to move the impacted material with lubricants and cathartics, or

surgically emptying the abomasum.

 Balanced electrolyte solutions are infused intravenously on a continuous basis for up to 72 hours at a rate of 100-150 mL/ kg BW over a 24-hour period. Some cases will respond remarkably well to this fluid

Dioctyl sodium sulfosuccinate is administered into the rumen by stomach

tube at a dose rate of 120-180 mL of a 25 % solution for a 450 kg animal repeated daily for 3-5 days. It is mixed with 10 L of warm water and 10 L of mineral oil.

 A beneficial response cannot be expected in less than 24 hours and most cattle that do respond will show improvement by the end of the third day after treatment begins. Cholinergics such as neostigmine, physostigmine and carbamylcholine have been used but appear not to alter the outcome.

**Surgery**

 Surgical correction consists of an abomasotomy through a right para­

median approach and removal of the contents of the abomasum. The results are

often unsuccessful, probably because of abomasal atony that exists and that

appears to worsen following surgery. An alternative approach may be to do a

rumenotomy, empty the rumen and infuse dioctyl sodium sulfosuccinate

directly into the abomasum through the reticulo -omasal orifice in an attempt to

soften and promote the evacuation of the contents of the abomasum. Mineral oil can then be pumped into the abomasum at the rate of 2 L/day for several days. Recovery should occur within 5-7 days.

 The induction of parturition using 20 mg of dexamethasone intramuscularly

may be indicated in affected cattle that are within 2 weeks of term and in which the response to a few days' treatment has been unsuccessful. Parturition may assist recovery as a result of a reduction in intraabdominal volume.