

# Salt Poisoning/Water Deprivation

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Dehydration is a common sequel to many disease problems and management circumstances. The pig appears to be particularly vulnerable to a form of dehydration that presents as a specific disease entity, which we refer to as salt poisoning or water deprivation.

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The body always tries to keep a balance between water and dissolved salts - not just Sodium Chloride - and this balance is maintained by a wide range of physiological processes that involve:-

- a) The kidneys as the primary fluid balancing organ
- b) The liver processing waste
- c) The intestines absorbing and excreting water
- d) The respiratory system losing water during breathing

The skin - less important in the pig than in man, but still critical in controlling fluid balance.

The organs work with the raw materials - food and water - to keep the body in a stable state. Any failure of raw material supply or organ function can lead to imbalance between salts and water and the pig can then manifest a classical salt poisoning.

The development of the disease is based on osmotic changes in the brain. If the pig becomes dehydrated, the salt content of the brain becomes concentrated. The same can happen if excessive salt intake occurs without sufficient water intake. Whilst this in itself can provoke clinical disease, greater problems occur when the pig is re-hydrated. The high concentration of salt in the brain draws water in and the brain swells. It is this swelling within the rigid skull which produces the clinical signs and ultimately death in many cases.

## Clinical signs

The clinical disease presents as a nervous disease, often confused with but distinct from meningitis. In a mild form, the pig is simply depressed and dull and may stand or "dog sit", sometimes pressing the head against a wall - suggesting pain. As the disease develops, and this can occur very quickly, the pig may collapse and show mild paddling movements (convulsions). One classic sign of salt poisoning in the pig is termed opisthotonus. The pig will "dog sit" but its head will be held upwards and backwards towards its shoulders, such that in extremes it will fall over backwards.

The eyes are likely to twitch within the sockets (nystagmus).

The pig may appear to be blind. High temperature is not a common feature of salt poisoning - distinguishing it from meningitis, although small rises in temperature - up to 40°C

can occur. "Sudden" death may be seen in individuals, it taking minutes from first signs to death in severe cases. Frequently the signs will not appear until water supply is restored following some form of restriction.

## Development of Disease

In broad terms, salt poisoning will occur as a result of one of three set of circumstances:-

1) Lack of water supply. This can result from:-

- a) Freezing of supplies in winter
- b) Blockage of pipes e.g. by dead rodents, yeast deposits (especially following water medication with sugar based products)
- c) Blockage of float valves on bowls and troughs (e.g. with straw)
- d) Shortage of drinker availability - the current Red Tractor (RT) standards, if applied, should provide more than enough access for pigs.
- e) Lack of water pressure and flow rates.
- f) Inattention e.g. failing to turn water on when pigs are housed.
- g) Unpalatable water supply (some poultry antibiotic preparations used off licence have historically caused complete refusal of water by pigs.

2) Excessive salt intake - particularly seen in wet fed and bi-product fed pigs where diets have high salt levels and supplementary water is not provided. A benchmark figure for water requirement for growing pigs is 100ml per kg liveweight, but this can increase 3 fold in hot weather or with salt rich diets. Experience suggests that even diets containing as much as 4% salt - such as can occur with some bi-products - do not cause problems for pigs provided sufficient water is available.

Occasionally, errors will be made in diet manufacture providing excess salt to pigs; increased salt levels are frequently used to reduce vice but, if water is restricted, problems can result.

In general, the pigs will cope with any palatable level of salt in the diet, providing water is freely available.

3) Other diseases.

Pigs that are seriously ill may reduce water intake or suffer excessive fluid loss e.g. Strep Meningitis, Swine Dysentery respectively. Pigs affected by these diseases can actually die of salt poisoning. It should be noted that the stress induced by lack of water can also trigger a range of either as a result of dehydration caused by the primary disease (eg scour) due

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to an inability to get to water (eg lameness) or an impaired ability to access and swallow water (eg meningitis). (It should be noted that the stress induced by lack of water can also trigger a range of endemic diseases creating a very complex diagnostic challenge).

The diagnosis can only be confirmed at post mortem by a combination of histopathological examination of the brain and brain chloride assay.

## Treatment

The treatment of pigs that have been deprived of water is very difficult; restoration of a full water supply will actually trigger more severe disease as the pigs attempt to restore their fluid balance. Provision of unlimited water floods the brain and leads to rapid swelling that produces the classic salt poisoning clinical picture.

Pigs that have had restricted water intake must have it restored in a limited way, such that they only take small amounts over a period of time. In frozen conditions, eating snow can act as a useful method of slowly restoring fluid intake particularly as pigs will only tend to pick at it and take in small quantities slowly.

An attending veterinary surgeon may employ other techniques to restore fluid (such as per rectum infusion or intra-peritoneal injection) but this must only be done under direct veterinary guidance.

Whenever a pig is affected by serious disease, part of the treatment regime must involve provision of fluid to stop the animal developing salt poisoning. This is particularly important in diseases of high fluid loss (e.g. scour) or where the pig is unable to get to water (e.g. severe lameness, meningitis).

## Prognosis

Provided the pig can be slowly re-hydrated, many will recover over a 24-48 hour period, although some may be left with permanent brain damage requiring euthanasia.

## Prevention

Clearly, maintaining a clean fresh freely accessible supply of water is essential.

- 1) Every water supply point (nipple, bowl or trough) must be checked at least daily and more frequently at times of high usage.
- 2) Keep water tank lids tightly shut.
- 3) Regularly wash out pipelines - especially after medication - using a water disinfectant.
- 4) Have contingency plans available if supplies freeze up.
- 5) Maintain a reservoir of water on farm to provide at least 24 hours supply.
- 6) Ensure availability of drinking points - for example in line with RT standards.

7) Check flow rates. If sufficient nipples are available, a flow rate of 500ml per minute is normally adequate. (The DEFRA Code of Recommendations suggests flow rates of up to 500ml per minute for pigs <20kg; 1000 ml per minute for growers and finishers; and 2000 ml/minute for adults)

8) Provide additional water to wet and bi-product fed pigs.

Attend to the fluid requirements of sick pigs (e.g. 3-4 times daily in the case of meningitis).

## Costs

The cost implications of water deprivation are highly variable. Where sub-clinical the effect may simply be to reduce feed intake (reducing growth) or causing loss of homogeneity in a group. This is particularly the case where inadequate water points are provided.

At the other extreme, total loss of water supply over a weekend due to freezing, with subsequent restoration, in a straw yard of 650 growing pigs caused mortality levels of 40%, a disaster both financially and in pig welfare terms.

Always remember, 24 hours without food will stop growth, 24 hours without water will kill.

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