

In all probability this mycosis, as in fowl favus, assumed a fatal form when extending to the feathered portions of the skin, death being preceded by cachexia and diarrhœa.

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MORTALITY IN CAMELS CAUSED BY INGESTION OF SAND.

By Major F. E. MASON, R.A.V.C., Sub-Director and Veterinary Pathologist, Veterinary Service, Ministry of Agriculture, Cairo.

EARLY in April 1916 I was required to investigate the cause of a high mortality in two Indian camel corps, which were at that time stationed on the sandy desert at Salhia. The mortality started about ten days after arrival in that locality, and a large number of deaths following a short illness had occurred. The rate of mortality at the time of my visit was about one camel per hour.

The symptoms seen during life were: profuse vomiting, diarrhœa, typanites, colicky pains, and depression. In most cases the temperature remained normal, but in some cases it was elevated. In many fatal cases there was no rise of temperature before death. The temperature was little use as a guide as to termination. In some cases the animal was found dead, no symptoms having been observed.

Autopsies conducted on sixteen camels showed the following lesions:—

Peritoneum: slight patchy inflammation. Rumen: contained food mixed with sand; the so-called "water-pouches" were also filled with sand, and in some cases sand was found in these only, and in small quantity, causing inflammation of the lining membrane. Reticulum: in most cases intensely inflamed, with sand present between the papillæ. Abomasum: deeply inflamed, particularly at the cardiac extremity, where an accumulation of sand was found and the membrane had an excoriated appearance; contents coated with mucus. Intestines: patchy hæmorrhagic inflammation, particularly at those parts which normally contain solid or semi-solid ingesta; contents frequently gritty, but not always. Heart: hæmorrhagic patches. Lungs, kidneys, spleen, and liver normal.

Specimens were collected and examined—blood, peritoneal impressions, mesenteric glands, intestinal scrapings, etc.—and all gave negative results for pathogenic organisms.

Enquiry showed that the camels in question came from a region in India where sand does not exist.

It was observed that, in contrast with Egyptian or Sudanese camels, which are accustomed to sand, many of these camels which were not accustomed to it were peculiarly careless in the way in which they would pick up particles of forage material which had fallen on to the desert, taking with each particle an appreciable quantity of sand, which was swallowed with the food.

Examination of a large number of mouths between feeding times showed they contained much sand, to such an extent that a pinch of it could easily be collected from the surface of the tongue, which is not seen in Sudanese camels, and rarely in Egyptian camels, under similar conditions.

The following recommendations were made with the object of preventing further ingestion of sand and of clearing out that already ingested :—

- (1) A full dose of oil to be given to each camel.
- (2) Muzzles to be constantly worn when not feeding.
- (3) Salt ration of $1\frac{1}{2}$ oz. daily to be issued.
- (4) Grazing not objected to.

The mortality, which had reached very high proportions, ceased in fourteen days.

However, before this result was obtained, I was required to prove that the mortality was not due to a contagious or epizootic disease.

The two camel corps in question had been moved to El Ferdan, also a sandy desert. Another Indian camel corps, which, I ascertained, emanated from a locality in India similar to Egyptian desert, was also stationed there. No such cases occurred in this corps, which I will call "C," the previously mentioned corps being "A" and "B" respectively.

Accordingly, twelve Egyptian camels having been obtained and six Indian camels of corps "C," the following experiments were made to test the possibly contagious nature of the disease :—

Line 1.—Four Indian camels of corps "C" were placed in close contact with two sick animals of corps "A." The latter, assisted by the prevailing wind, vomited freely over the faces of their fellows.

Line 2.—(i) Two Indian camels, corps "C," inoculated subcutaneously with 2 cc. citrated blood from a sick animal of corps "A," which had a temperature of 40.1°C . (104.2°F). (Blood examination negative.)

(ii) Egyptian camels (two) inoculated subcutaneously with 2 cc. of same blood.

(iii) Egyptian camel inoculated intravenously with 2 cc. blood from sick camel, corps "A," which had normal temperature.

(iv) Egyptian camels (two) inoculated subcutaneously with blood from sick camel, corps "A."

(v) Placed with the above in Line 2 two healthy Egyptian camels as controls.

Line 3.—Egyptian camels (five) in contact with three sick camels of corps "A."

The whole were observed for fifteen days, with temperatures taken twice daily.

In no case was the disease transmitted either to Egyptian or Indian camels, and it was considered that the non-contagious nature of the disease had been demonstrated.

Subsequent to this, corps "A" was lost sight of by the writer; corps "B" was sent further east into the desert, where the mortality reappeared after about two and a half months.

Reinvestigation on the spot showed that the symptoms seen in the sick camels and the autopsies made were exactly similar to those seen in corps "A" and "B" during the first outbreak at Salhia and El Ferdan. It was concluded that, as in the former instance, the deaths were due to ingestion of sand. In addition to the sand taken in from the desert with food, it was found that the coarse "busa" in bales (from India) was also probably a vehicle of conveyance, as it contained much fine sand.

It was further noticed that with few exceptions all the camels of the corps were poor in condition and suffering from digestive troubles, whereas in April their general condition was distinctly good.

Being unfit for work, all the camels of the corps were brought in; each camel was given a quart of linseed oil, and all food other than grazing was withheld.

The mortality ceased in fourteen days.

Subsequent to this, owing to military necessity, the corps was sent back to the desert and ordinary feeding resumed; in four days the mortality recommenced.

Summary.

In my opinion it is sufficiently clear that the cause of mortality was the ingestion of sand, and not the result of the invasion of any specific organism or of any contagious disease.

No cases occurred in the Indian camel corps referred to as "C," which emanated from a sandy region of India and was stationed for some time in close proximity to corps "A" and "B" under exactly similar conditions, nor was any similar mortality observed in Sudanese or Egyptian camels.

It appears that it is dangerous to employ on desert work camels that are totally unaccustomed to sand.

TREATMENT OF ULCERATIVE LYMPHANGITIS BY VACCINES MADE FROM THE PREISZ-NOCARD BACILLUS PREPARED WITH ETHYL-CHLORIDE.

By Captain R. H. KNOWLES, R.A.V.C., Officer in Charge,
Veterinary Bacteriological Laboratory, Italy.

TREATMENT of ulcerative lymphangitis by vaccines has previously been carried out by Montgomery, Truche, and Watson with a varying amount of success.

Montgomery (1) says that successful results were obtained at his laboratory by weekly injections of a vaccine made from the Preisz-Nocard bacillus. When tried on a large scale, however, satisfactory results were not obtained.

Truche (2), of the French Army, used a vaccine prepared from the Preisz-Nocard bacillus. He used alcohol and ether in the prepara-