Aquatic Mammals 1990, **16.1**, 23–27

Evolution of clinical signs in a baby dolphin (*Tursiops truncatus*) found in a river

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Introduction

It could happen that a sea cetacean, usually a dolphin, goes up a river and gets trapped. The various reasons why marine mammals are trapped in fresh water are for example the nearness of a sea port at the mouth of a river, injuries or illnesses causing the loss of sense of direction, the death of the young mammal's mother, the loss of the school and unknown causes. When the marine mammal reaches fresh water it is no longer in its physiological habitat, as the physico-chemical conditions (pH, temperature, salinity) are quite different from those of sea water. The consequences on the mammal's health depend on the length of its stay in fresh water, its age and on its previous health conditions. For example it can suffer from: dehydration, underfeeding, food-intoxication or poisoning, and stress with consequent alterations in serological and haematological parameters. Due to its duration in the fresh water the mammal becomes more subjected to opportunistic illnesses (like parasitic-infestations, viral and bacterial infections) which will make its clinical situation worse.

Materials and methods

Here we describe a baby dolphin, of about one year old, found in an Italian ship canal, on 15 January 1987, a male *Tursiops truncatus*, common to the Adriatic Sea. It was found in the vicinity of Comacchio (Ravenna, Italy) 10.5 km from Garibaldi's Port. After 8 days in the canal, the baby dolphin, nicknamed 'Baby Garibaldi', had weakened and sheltering was absolutely necessary. It was captured and recovered at the 'Adriatic Sea World', a Dolphinarium in Riccione (Italy). 'Baby Garibaldi' was submitted to clinical, serologic, haematologic and faecal examination and was attended by Dr David Taylor. The dolphin's condition indicated that it was underfed, dehydrated, stressed, and had a high breathing frequency. For the first 3 days the dolphin refused food and forced feeding was needed; later it started eating spontaneously. Recovery was followed by biochemical tests and 8 blood samples were taken; on the 1st, 6th, 15th, 26th, 30th, 36th, 40th and 45th day. Blood samples were taken each morning from the lateral veins on the ventral or dorsal aspect of the tail flukes. EDTA was used as the anticoagulant for routine haematology samples and heparin was used for biochemical analyses. Haematological and serological analyses were carried out within a few hours of sampling.

The laboratory methods used during these studies were the following:

White Blood Cell (WBC)—methods based on changes of potential-difference at the passage of the white cells into a cell; automatic cell counter, Cell-Dyn 2000, Sequoia Rurner.

Total Protein—End point, colorimetric and Biuret method; auto-analyser, Yookoo CTE-150.

Gamma Glutamil Transferase (GGT) activity—Kinetic and colorimetric method; temperature 37°C; auto-analyser, Hitachi 704.

Serum Glutamic Oxaloacetic Transaminase (SGOT) and Serum Glutamic Pyruvic Transaminase (SGPT) activity—UV, kinetic method; standard IFCC; temperature 37°C; auto-analyser, Hitachi 704.

Lactic Dehydrogenase (GGT) activity—UV, kinetic method; temperature 37°C; auto-analyser, Hitachi 704.

Results and Discussion

The biochemical tests showed that, with respect to the normal range of serological and haematological parameters in *Tursiops truncatus*, there were some alterations which are shown in Figures 1, 2, 3, 4, 5, 6 and in Table 1. The chief changes were observed in: White Blood Cell (WBC) count; Total Protein Value; Gamma Glutamyl Transferase (GGT) activity; Serum Glutamic Oxaloacetic Transaminase (SGOT) activity; Serum Glutamic Pyruvic Transaminase (SGPT) activity; Lactic Dehydrogenase (LDH) activity.

'Baby Garibaldi' tended to have a high white blood cell count as compared to that of the normal

Figure 2. Intermandibular mass composed of cyst-like structures lined by a flattened squamous epithelium and containing keratin and debris.

Histologically, the intermandibular cystic mass was composed of multiple cyst-like structures lined by a flattened squamous epithelium surrounded by a dense connective tissue stroma (Fig. 2). The cysts contained concentrically and irregularly laminated masses of keratin admixed with debris. Skin adnexae were not associated with the cyst wall. A diagnosis of multiple, epidermoid cysts was made.

Discussion

In captive pinnipeds, the most common skin lesions include traumatic wounds, bacterial folliculitis with pustular dermatitis, seal pox, dermodicosis and pediculosis (Lewis, 1987). Less frequently, mycotic infections and cutaneous mycobacteriosis are noted (Lewis, 1987).

Cutaneous and subcutaneous neoplasms are infrequently reported in both Sea Lions and seals. Previously described tumours in California Sea Lions have included an apocrine gland adenocarcinoma (Simpson & Gardner, 1972), a squamous cell carcinoma (Landy, 1980) and a leiomyoma (Howard *et al.*, 1983). A fibroma has been described in a Gray seal, and an unspecified subcutaneous neoplasm has been reported in a Southern Elephant seal (Mawdesley-Thomas, 1974). A metastatic squamous cell carcinoma within the kidney, lungs, liver, ovary and lymph nodes has recently been described in a California Sea Lion (Joseph *et al.*, 1986). The primary site was not identified.

The etiology of squamous cell carcinoma can include factors such as ultraviolet light, various chemical carcinogens, chronic infections, burns, and immunosuppressive drug therapy (Muller *et al.*, 1989; Lever & Schaumberg-Lever, 1983). Rarely, squamous cell carcinomas arise from persistent, keratinizing cysts (Lever & Schaumberg-Lever, 1983; Mehregan, 1986; Yager and Scott, 1985). In the Sea Lion reported herein, there was no histopathological evidence to suggest that the squamous cell carcinoma had arisen from the epidermoid cysts.

Epidermoid cysts are common in the dog, less common in the cat (Muller *et al.*, 1989) and rare in the larger domestic animal species (Scott, 1988). To our knowledge, such a lesion has not been previously characterized in a pinniped.

Acknowledgement

The authors wish to thank Dr A. W. Prowten of the Buffalo Zoological Gardens (Buffalo, New York) for submission of tissue samples from this case.

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Table 1. The sequential values of the six parameters considered in this study

Parameters	Units	Normal range	Number of samples 1	2	3	4	5	6	7	8
WBC	no $\times 10^3$/cmm	6.0–13.0	9.9	13.1	11.7	16.3	14.0	15.1	17.1	13.1
T. protein	g/dl	6.8–8.0	6.7	6.3	5.5	5.8	—	—	6.1	5.7
GGT	mu/ml	<30	45	43	29	24	25	—	25	31
GOT	mu/ml	<200	1105	387	197	263	124	127	149	328
GPT	mu/ml	<40	900	154	161	140	43	33	39	129
LDH	mu/ml	<500	1100	490	336	378	376	349	—	592

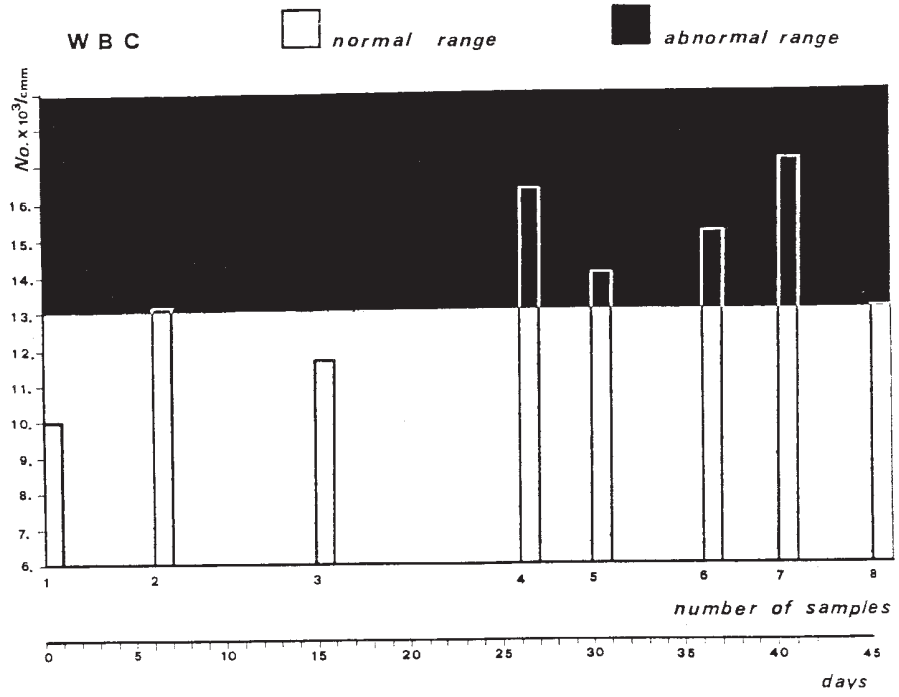

Figure 1.

range value (Fig. 1). Leukocytosis in a dolphin is associated with inflammations and infections. The slight and constant leukocytosis (maximum 17.1×10^3/cmm) observed in this case was attributed to a persistent state of shock, an hepatic inflammation and probably a virus (skin-disease). Total protein was found to have a low concentration (of 5.5 to 6.7 g/dl) indicating a diet almost devoid of protein (Fig. 2). Hypoproteinemia occurs in cases of malnutrition, hepatic insufficiency, gastro-intestinal parasites and malabsorption. In our case, faecal samples revealed cestode ova hence the animal was immediately treated with anthelminthics and the cestode ova cleared up.

Gamma Glutamyl Transferase (GGT) activity showed higher levels at the first blood abstraction (45 mu/ml) and at the second (43 mu ml). High levels of GGT activity are observed in all the liver disease. In our case, the high values of GGT activity revealed an hepatic damage probably of toxic origin (Fig. 3).

Figures 4 and 5 show very high levels of these Glutamic Oxaloacetic Transaminase (GOT) and Glutamic Pyruvic Transaminase (GPT) activity confirming existence of hepatic damage.

The Lactic Dehydrogenase (LDH) activity is used to indicate pathological conditions although not of any specific tissue. A very high level were also found at the first blood abstraction of this enzyme

6	7	8
15.1	17.1	13.1
—	6.1	5.7
—	25	31
27	149	328
33	39	129
49	—	592

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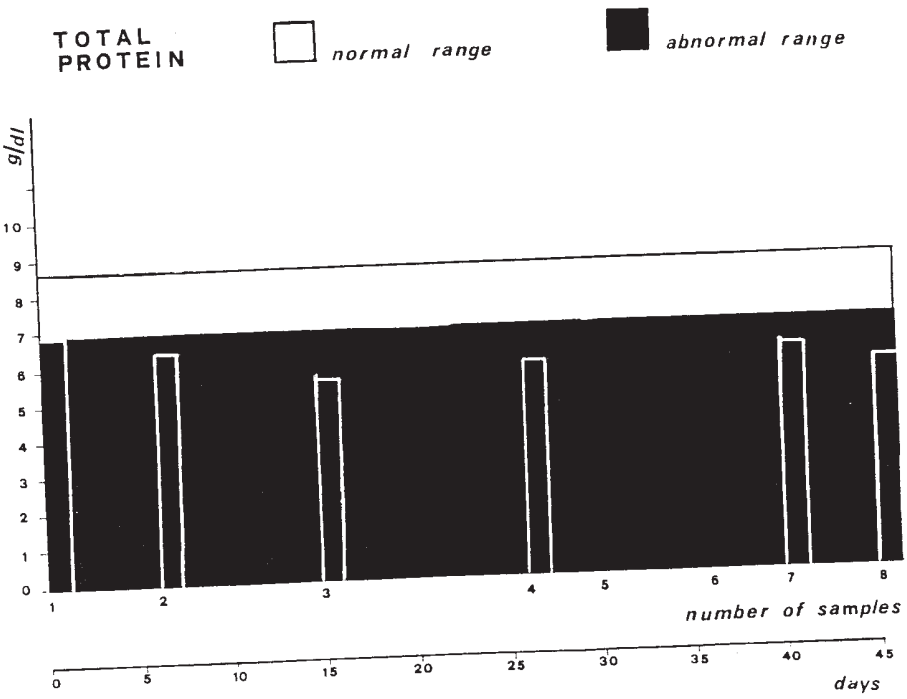

Figure 2.

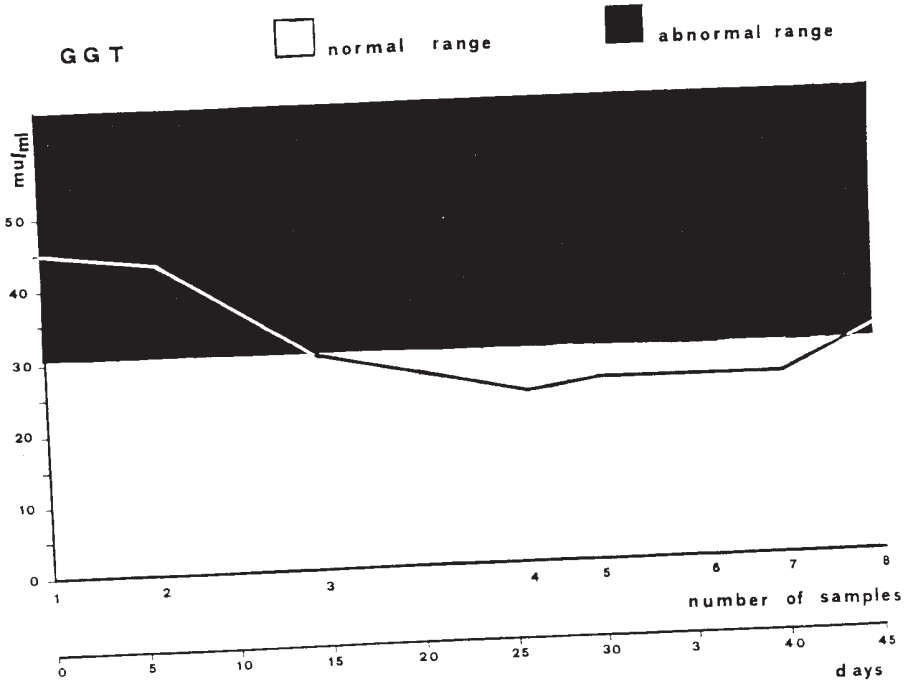

Figure 3.

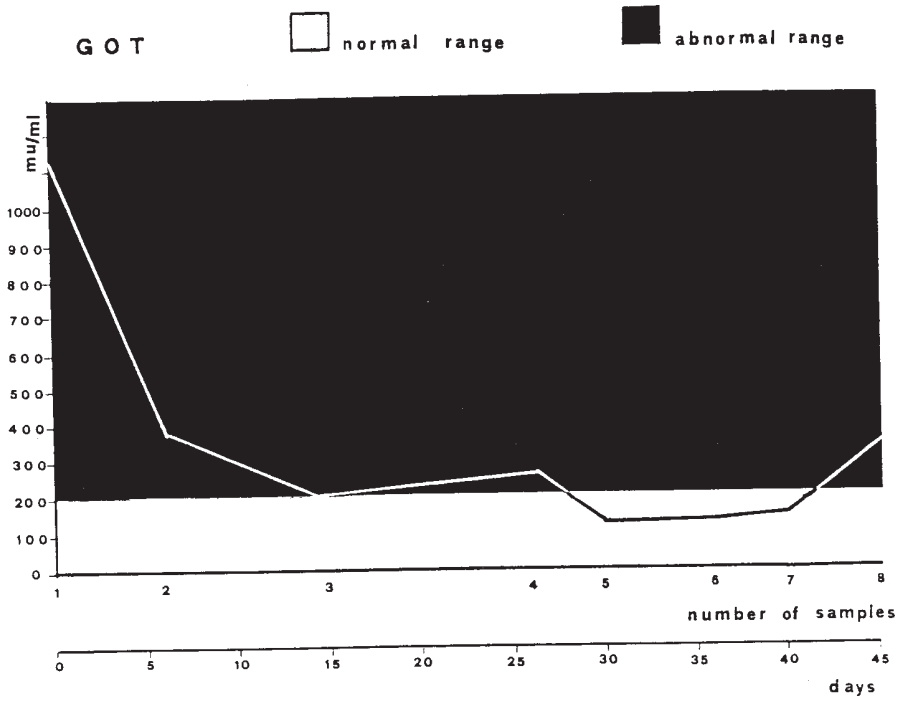

Figure 4.

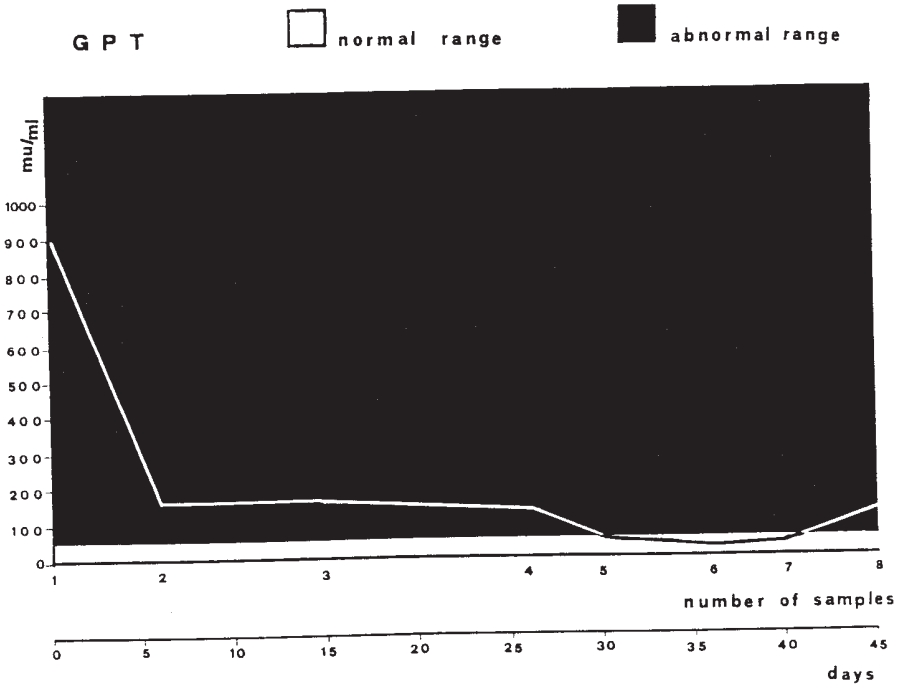

Figure 5.

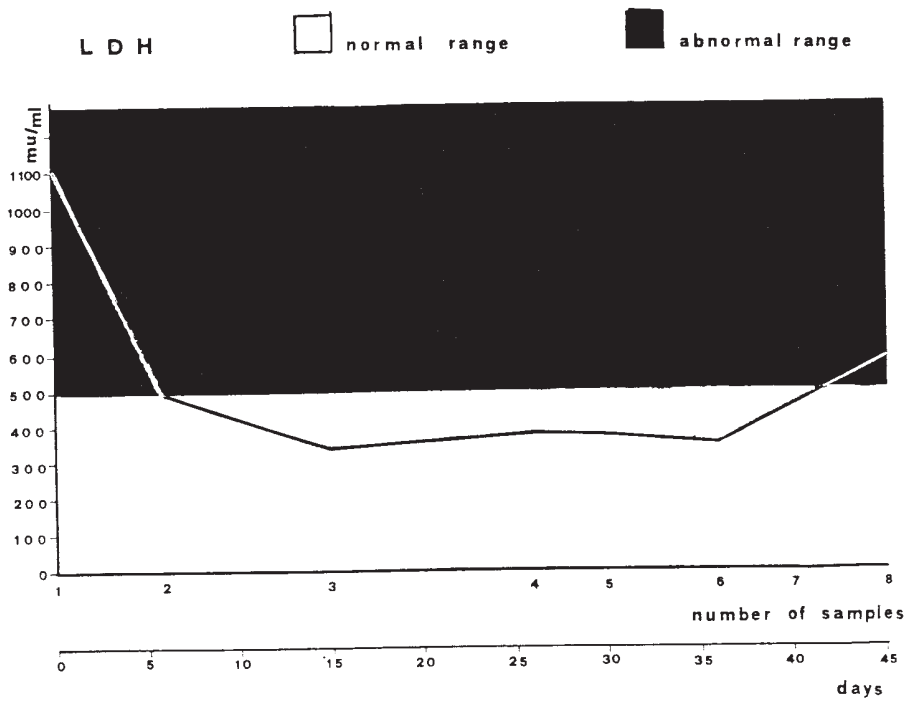

Figure 6.

(1100 mu/ml) but it could have also been due to shock caused by the capture, transport and fasting (Fig. 6).

Conclusion

The clinical training and the biochemical parameters permitted a diagnosis of hepatic suffering from stress, malnutrition or underfeeding and parasitic infestations (by taenia).

The results suggested a therapy which consisted of antibiotics, rehydration plus added vitamin B complex. Then, before its release 'Baby Garibaldi' was injected with an erysipelas vaccine.

The daily administration of the antibiotics were at 0900, 1600 and 2300 which were added to the fish diet, except for the vibramicine and gentamicin administrated the parenteral way. The antibiotic treatment was given in the following order: Amoxicillin for 6 days, cephalexine for 8 days, vibramicin for 6 days, eritromicine for 6 days, chloramphenicol for 6 days, solphametopirazine for 7 days, and gentamicin for 6 days. The above demonstrates the importance of the laboratory analysis as a diagnostic-aid for the veterinarian to formulate the diagnosis and the therapy.

'Garibaldi's' parameters had improved but not completely normalized. However the release of the subject in the sea was decided to avoid difficulties in the readaption to wild life, caused by too much time held in captivity. Before releasing 'Baby Garibaldi' near a group of dolphins, a 'G' was marked on a dorsal fin, this to allow eventual sighting.

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