

# The importance of *post mortem* exam in otter (*Lutra lutra*) conservation: lesions associated with hydroelectric dams and vehicle collision

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## INTRODUCTION

The *post-mortem* exam plays an important role in the diagnosis and investigation of wildlife diseases (1–3). Also, it can provide background information not only about the health of the individual, but also of its population and ecosystem (2). The *post-mortem* exam can be the first tool to identify the impact of human action on the ecosystem and on the wild populations, and which anthropogenic pressure is the most predominate in determinate area or specie. (4).

The Eurasian otter (*Lutra lutra*: Linnaeus, 1758) has the widest distribution of all otter species and is listed Near Threatened by in the IUCN Red List Endangered Species. Human activities have been leading to population decline in the last decades across the major parts of Europe, with Portugal not been an exception (5). Some of the major threats for otters' populations are roadkill and destruction of the aquatic habits (6).

Roads are one of most widespread human constructions that changed natural landscape in the last decades. Wildlife losses on highways is related to both to the conditions and location of the road, and the biology and ecology of resident wildlife. Areas with a higher road density are particularly concerned, because the risk of mortality is higher (7). By other hand, the aquatic habits are very sensitive and the construction of large infrastructures that interrupt or deviation of the water flux can have a great impact on the fauna and flora populations (8).

## MATERIAL AND METHODS

In order to contribute to the identification of injuries suggestive of trauma associated with vehicle collisions or caused by the access to dams, in this work we intend to present different gross lesions observed in the *post mortem* examination. All the animals were necropsied at the Laboratory of Histology and Anatomical Pathology of the University of Trás-os-Montes And Alto Douro (LHAP-UTAD) necropsy service, according to the techniques described, following the standards of security and hygiene (3). Figure 1 resumes the necropsy technique used.



Figure 1: Necropsy technique.

## RESULTS AND DISCUSSION

In run over otters necropsied, gross lesions observed were extensive, of great severity and reflect a violent death. In general, the lesions were multiple and affect different organ systems. The main injuries observed were abrasions, lacerations and avulsions of the skin, bone fractures, including the ribs, head trauma, spinal trauma and rupture of internal organs, especially the heart, lungs and liver, associated with internal bleeding. Indeed, trauma is a major cause of death in otter that suffered impact with the vehicle (9). The injuries have a wide spectrum, and variable lesions were observed, depending on the type of the road, the type and the speed of the vehicle and the position of the animal (10).

In the case of otters entrapped in dams, two causes of death should be considered: drowning or/and trauma. Although not pathognomonic, the observation of increased lungs weight, pulmonary oedema and the presence of fluid or foam in oropharynx and trachea allow the diagnose of water aspiration. In some cases, external signs can be observed that may indicate an attempt to escape the animal, when trapped, such as skin lesions or erosions on the legs. In the cases of traumatic lesions associated to dams, considered less frequent (8), they were similar to the described in run over cases, and include fracture of teeth and bones, brain trauma, in addition to lesions on the internal organs.

Figure 2 represents different lesions presented by the animals that suffered vehicle collision and dam's entrapment



Figure 2: Lesions associated to vehicle collision and dam's entrapment (1 – teeth fractures and hemorrhage, 2 – presence of brain tissue in the nostrils, indicative of severe brain trauma; 3 – skull fracture; 4- subcutaneous and muscular extensive hemorrhage; 5 – lungs rupture and hemothorax; 6 – hemothorax; 7 – ribs fracture; 8 - heart rupture; 9 – liver rupture; 10- nail traumatic compatible lesions; 11 - lesions on the hind palmar face; 12 – brain hemorrhage; 13 – heavy and edematous (drowning) lungs; 14 - foamy fluid on the trachea and pulmonary oedema. 15 – fluid on the trachea)

## References

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The *post-mortem* exam is one of the easiest and inexpensive procedure that allows to identify lesions and contribute to the determination of the cause, mechanism and circumstances of death (1–3). A critical point of necropsy is the knowledge and the correct interpretation of the lesions. Other data are important such as the local and the conditions where the animal was found (near a road or a dam, inside water) to achieve a correct cause of death, special when traumatic lesions could be similar among various causes of death.

## CONCLUSION

*Post mortem* examination should be regarded not only as a diagnostic tool but also as a gold opportunity to understand the death and the life of the animal, identifying threats to its population and to the health of its ecosystem. In this study, severe traumatic and drowning lesions were identified. Larger mortality studies are needed, including otters that died in road traffic and dams' accidents, with proper identification of lesions. The knowledge of the real impact of these anthropogenic factors in the otter population in a geographic area could lead to the establishment of new strategies to prevent associated mortality. A constant monitoring of the infrastructures namely of barriers or control gates is fundamental to avoid the access of the animals to roads or dams' dangerous areas such as penstock and even turbines.