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DISEASE IN WILDLIFE OR EXOTIC SPECIES

Uterine Leiomyoma and Prolapse in a Live-stranded Atlantic Spotted Dolphin (*Stenella frontalis*)

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Summary

A uterine prolapse associated with a leiomyoma (fibroid) was observed in a live-stranded Atlantic spotted dolphin (*Stenella frontalis*). A 7 cm segment of the reproductive tract including the cervix, uterine neck and caudal uterine body had intussuscepted and prolapsed into the cranial vaginal vault. In the leading edge of the intussuscepted/prolapsed uterine wall was a 6 × 3 × 3.5 cm leiomyoma expanding the myometrium. The leiomyoma and prolapse were associated with necrotizing exposure endometritis. This is the first report of a uterine prolapse associated with a leiomyoma in a cetacean. This lesion was believed to be the underlying cause of the live stranding.

Keywords: Atlantic spotted dolphin; leiomyoma; prolapse; uterus

Neoplasia of the female reproductive tract of cetaceans is difficult to assess in live animals, but has been reported in free-ranging and captive species. Primary ovarian tumours described include: a dysgerminoma in a Dusky dolphin (*Lagenorhynchus obscurus*) (Van Bressem *et al*., 2000); a granulosa cell tumour in a harbour porpoise (*Phocaena phocaena*) (Seibel *et al*., 2012), a short-finned pilot whale (*Globycephala macrorhynchus*) (Benirschke and Marsh, 1984), a beluga whale (*Delphinapterus leucas*) (Martineau *et al*., 1988), a blue whale (*Balaenoptera musculus*) and a fin whale (*Balaenoptera physalus*) (Rewell and Willis, 1950); a granulosa cell tumour and a carcinoma in a fin whale (Stolk, 1950); a mucinous cystadenoma in a blue whale (Rewell and Willis, 1950); and an ovarian papilloma in a short-finned pilot whale (Marsh and Kasuya, 1984). Primary uterine neoplasms include: fibromyomas in a sperm whale (Uys and Best, 1966) and a blue whale (Stolk, 1950); fibroleiomyomas in Dusky dolphins (Van Bressem *et al*., 2000) and beluga whales (Mikaelian *et al*., 2000); leiomyomas in a long-finned pilot whale (*Globicephala melas*) (Cowan, 1966), beluga whales (Newman and Smith, 2006), a sperm whale (Uys and Best, 1966) and Dusky dolphins (Van Bressem *et al*., 2000); and uterine adenocarcinoma in beluga whales (Lair *et al*., 1998) and an Atlantic bottlenose dolphin (*Tursiops truncatus*) (Sanchez *et al*., 2002). Reported vaginal neoplasms include fibromas in a fin

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whale (Newman and Smith, 2006), a finless porpoise (*Neophocaena phocaenoides*) (Chen *et al*., 1982) and a Blainville's beaked whale (*Mesoplodon densirostris*) (Flom *et al*., 1980). Genital warts (condylomas) or viral papillomas also have been recognized in the genital slit, adjacent skin, vulva and vagina of Dusky dolphins (Van Bressem *et al*., 1996), Burmeister's porpoises (*Phocoena spinipinnis*) (Van Bressem *et al*., 2007), sperm whales (Lambertsen *et al*., 1987) and a long-beaked common dolphin (*Delphinus capensis*) (Van Bressem *et al*., 2006).

Leiomyomas, commonly known as fibroids, are the most common tumours of the human female genital tract (Goedken and Rock, 2003). Leiomyomas are composed of interlacing bundles of muscle fibres admixed with variable amounts of collagenous stroma; hence, the designation fibroleiomyoma is sometimes used. Although all leiomyomas are grossly similar, several histological subtypes are currently recognized including mitotically active leiomyoma, cellular leiomyoma, haemorrhagic cellular leiomyoma, leiomyoma with bizarre nuclei (atypical leiomyoma), epithelioid leiomyoma, myxoid leiomyoma, vascular leiomyoma, leiomyoma with other elements and leiomyomas with haematopoietic elements (Zaloudek *et al*., 2011). Diagnosis relies on histomorphological features and immunohistochemistry is seldom necessary.

Prolapse of the uterus and cervix into or through the vault of the vagina is associated with stretching of the endopelvic fascia (e.g. the cardinal and uterosacral ligaments), injury to the neuromuscular unit with relaxation of the pelvic floor muscles (e.g. levator ani muscles) or sometimes an underlying condition that increases intra-abdominal pressure such as ascites or large pelvic or intra-abdominal tumours superimposed on poor pelvic supports (Lentz, 2007). In veterinary medicine, uterine prolapse occurs frequently when the previously gravid uterine horn becomes invaginated after parturition and protrudes from the vulva (Troedsson and Christensen, 2015). In mares it is an uncommon sequela to parturition, associated with dystocia, retained fetal membranes or postpartum colic. In ruminants, most cases of uterine prolapse occur within a few hours after parturition, invariably associated with hypocalcaemia, which results in lack of uterine tone and delayed cervical involution and is frequently preceded by dystocia (Troedsson and Christensen, 2015). In dogs and cats, it is an uncommon complication during parturition and may follow normal labour or dystocia (Forsberg, 2010; Traas, 2010). Depending on its degree, uterine prolapse clinically may vary from asymptomatic to a life-threatening condition requiring immediate treatment.

Current human nomenclature for uterine prolapse distinguishes three degrees: first degree is a prolapse into the proximal vaginal vault; second degree is a prolapse through the vaginal vault to the region of the vestibule; and the third degree (or total) is when the cervix and uterus prolapse out through the vestibule. In total prolapsed uterus, the vagina is everted around the uterus and cervix and completely exteriorized (Lentz, 2007). When this occurs, the exposed tissue may develop dryness, thickening, chronic inflammation and ulcers of the vaginal epithelium.

To our knowledge, the only reported uterine prolapses in cetaceans involved three female finless porpoises (*N. phocaenoides*) (Parsons and Jefferson, 2000). Although these cases were fatal in two individuals, no underlying or associated pathology was detailed. This report describes a unique case of uterine prolapse associated with cervical leiomyoma in a stranded Atlantic spotted dolphin (*Stenella frontalis*).

A 172.5 cm long (blubber thickness 9 mm dorsally, 6 mm at the mid level and 8 mm ventrally at the cranial edge of the dorsal fin; girth at dorsal fin 102 cm), female Atlantic spotted dolphin stranded alive in Puerto del Carmen, Lanzarote (Canary Islands; 28°55′11″N, −13°39′47″W). Initially, bystanders tried to reintroduce the animal to deeper waters several times. They also reported this individual to be with a calf and a pod of dolphins of the same species. After unsuccessful attempts at reintroduction the animal was moved into a nearby pool. During handling, it developed repetitive spasms and expelled frothy fluid through the blowhole. Stranding myopathy and development of pulmonary oedema were presumed, and because of the poor prognosis for recovery, the dolphin was euthanized with intramuscular administration of 4 ml (5 mg/ml) of diazepam (Valium®; Roche Laboratories, Madrid, Spain), 3 ml (1 mg/ml) of butorphanol tartrate (Butorphanol®; Bedford Laboratories, Bedford, Ohio, USA) and 10 ml (200 mg/ml; intravenously) of pentobarbital (Dolethal®; Vétoquinol Ltd., Lure cedex, France), and was immediately submitted for necropsy examination.

The animal was in good body condition (Arbelo *et al*., 2013). Grossly, major findings were confined to the uterus. A 7 cm segment of the uterus including the caudal uterine body, uterine neck and cervix had intussuscepted and prolapsed into the cranial and mid vagina (first degree prolapse). The exposed prolapsed uterine endometrium was moderately thickened, dark grey to red, crusted and dull with many strands and plaques of fibrin (Figs. 1 and 2). On sectioning, the prolapsed segment was noted to have a 6 × 3 × 3.5 cm, well-demarcated, pale tan to white, firm and whorled mass expanding the myometrium