

Short Note

A Record of Twin Fetuses in a Harbor Porpoise (*Phocoena phocoena*) Stranded on the Dutch Coast

Lonneke L. IJsseldijk,¹ Andrea Gröne,¹ Sjoukje Hiemstra,¹
Jeroen Hoekendijk,² and Lineke Begeman¹

¹Utrecht University, Faculty of Veterinary Medicine, Department of Pathobiology, Yalelaan 1,
3584 CL Utrecht, The Netherlands
E-mail: l.l.ijsseldijk@uu.nl

²University of Groningen, Department of Marine Evolution and Conservation, Nijenborgh 7,
9747 AG Groningen, The Netherlands

Cetacean young must swim and maintain body temperature from birth, which requires a relatively high weight at birth as is seen in other precocial species (Derrickson, 1992). In dolphin species, an offspring's weight is approximately 10 to 15% of the weight of the mother, which almost always results in uniparity (Slijper, 1966). Twinning in cetaceans, therefore, appears to be a rare occurrence (González et al., 1999; Nakamatsu et al., 2001), but exceptions to this general rule occur.

An adult female harbor porpoise (*Phocoena phocoena*) was found dead along the coast of the Dutch island of Texel on 13 April 2011. The carcass was putrefied (stage 4 of decomposition condition codes), and an autopsy was conducted according to the protocol of Kuiken & García Hartmann (1991). The total length of the porpoise was 151 cm, and she weighed approximately 49.5 kg. The animal seemed in very good body condition, with blubber layers of up to 25 mm on the lateral body wall and ample internal fat. The stomachs and intestines were empty. Except for peck wounds and the presence of some old scars, the animal had no abnormal features externally. Parasites were present in the stomach wall (dozens of *Pholeter gastrophilus*), bile ducts of the liver (approximately 50 *Campulla oblonga*), airways and bronchi of the lungs (*Torynurus convolutus* and *Pseudalius inflexus* filling approximately 20% of the lumina of the main bronchi), and truncus pulmonalis of the heart (a few *Pseudalius inflexus*).

There were two corpora lutea in the left ovary, making this ovary twice the size and weight of the right ovary—6 g and 3 g, respectively (Figure 1). Two female fetuses were present in the left uterine horn (Figure 2) in separated placentas. They measured 47 and 49 cm in length, respectively,

and both weighed approximately 1.2 kg. One fetus had its tail near the *os uteri*; the other, its head. The advanced state of autolysis of the adult made it difficult to determine more subtle changes—for example, acute necrosis—of the organs, and it made microscopic examination of the organs impossible; therefore, cause of death of the adult female remains unknown.

Like other Odontoceti, the right ovary is inactive in harbor porpoises, and ovulation and pregnancy occur almost exclusively in the left ovary and uterine horn (Addink et al., 1995). The physiological mechanism for the observed asymmetry is unknown (Dierauf & Gulland, 2001). Since the corpus luteum graviditatis is formed and preserved both in terms of size and activity throughout the pregnancy in most cetaceans (Slijper, 1966), it could be speculated that since the harbor porpoise described herein had two corpora lutea, this case of twinning most likely resulted from a double ovulation (i.e., dizygotic). For Phocoenidae, twinning has only been described in the Dall's porpoise (*Phocoenoides dalli*); in this case, the ovary also showed two corpora lutea (Nakamatsu, 2001).

To assess the incidence of twinning in stranded harbor porpoises along the North Sea coastline, data on pregnancies were gathered and compared with institutes from countries bordering the North Sea that perform similar studies on dead, stranded cetaceans. Our study species was part of a large monitoring project in the Netherlands from 2008 to 2013, during which a total of 169 dead, stranded adult females were autopsied, of which 28 were pregnant. The databases from surrounding countries started in 1990, and data up through 2013 were used in this study. In Scotland, of 282 examined adult female harbor porpoises, 26 were

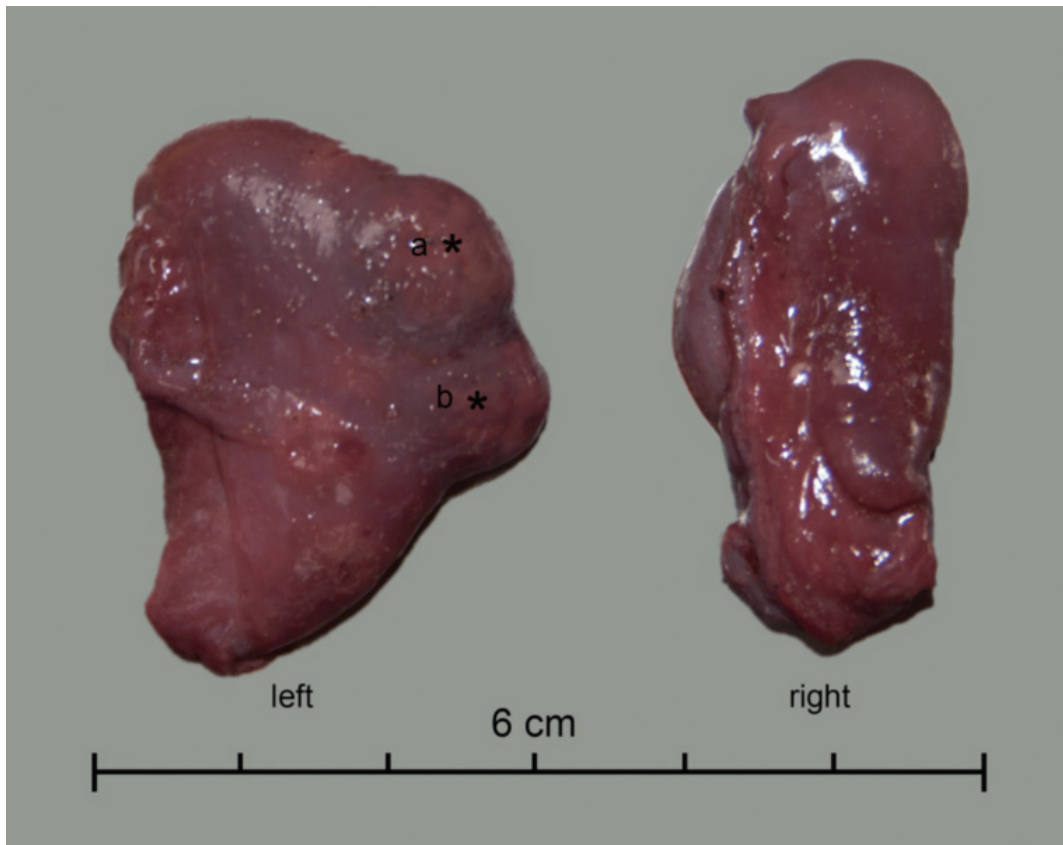


Figure 1. Left and right ovaries, with two corpora lutea visible on the left ovary (indicated with *a* and *b*)

pregnant (A. Brownlow/N. Davison, pers. comm., 11 April 2013); in Germany, of 461 adult female harbor porpoises, 48 were pregnant (U. Siebert, pers. comm., 15 April 2013); and in Belgium, of 85 adult female harbor porpoises, 18 were pregnant (T. Jauniaux, pers. comm., 8 May 2013). With the exception of the case reported here, all other pregnancies ($n = 121$) were singletons. The incidence of twinning in stranded harbor porpoises along the North Sea coastline therefore seems to be 0.83% (1/121).

Pluriparity in whales is occasionally described for Mysticeti (González et al., 1999). For small Odontoceti, twinning appears rare but has been reported in the striped dolphin (*Stenella coeruleoalba*) (Tobayama et al., 1970), the bottlenose dolphin (*Tursiops truncatus*) (Gray & Conklin, 1974; Lacave, 1991), the beluga (*Delphinapterus leucas*) (González et al., 1999; Osborn et al., 2012), and the common dolphin (*Delphinus delphis*) (González et al., 1999). Of these cases, only the common dolphin was a wild individual stranded dead, while the other animals were kept in captivity. These twins were all found dead, died during delivery,

or died within 24 h after birth, with no record of live and healthy twins available.

In other uniparous species for which twinning is rare, such as horses, twins are likely to be aborted at late-term, especially when they are unicornuate. Spontaneous abortions are likely because the area of placental contact with the uterus is insufficient to maintain fetal life (Blanchard et al., 2003). The same likely happens in harbor porpoises. If twinning occurs in this species, a limited surface in the uterus is available per placenta in comparison to a singleton. Slowed growth and development, as seen in this case, might be a sign of this insufficient space. According to a fetal growth curve based on data from the southern North Sea population (Gaskin et al., 1984), harbor porpoise fetuses should be approximately 60 cm in length in April (6 to 7 mo after fertilization). The short body length of the twins in this study compared to that of data on singletons suggests retardation in growth. The growth retardation in this case corresponds to a similar case of twinning in a Dall's porpoise harpooned in Japan by commercial fisheries (Nakamatsu, 2001). The calving season for Dall's

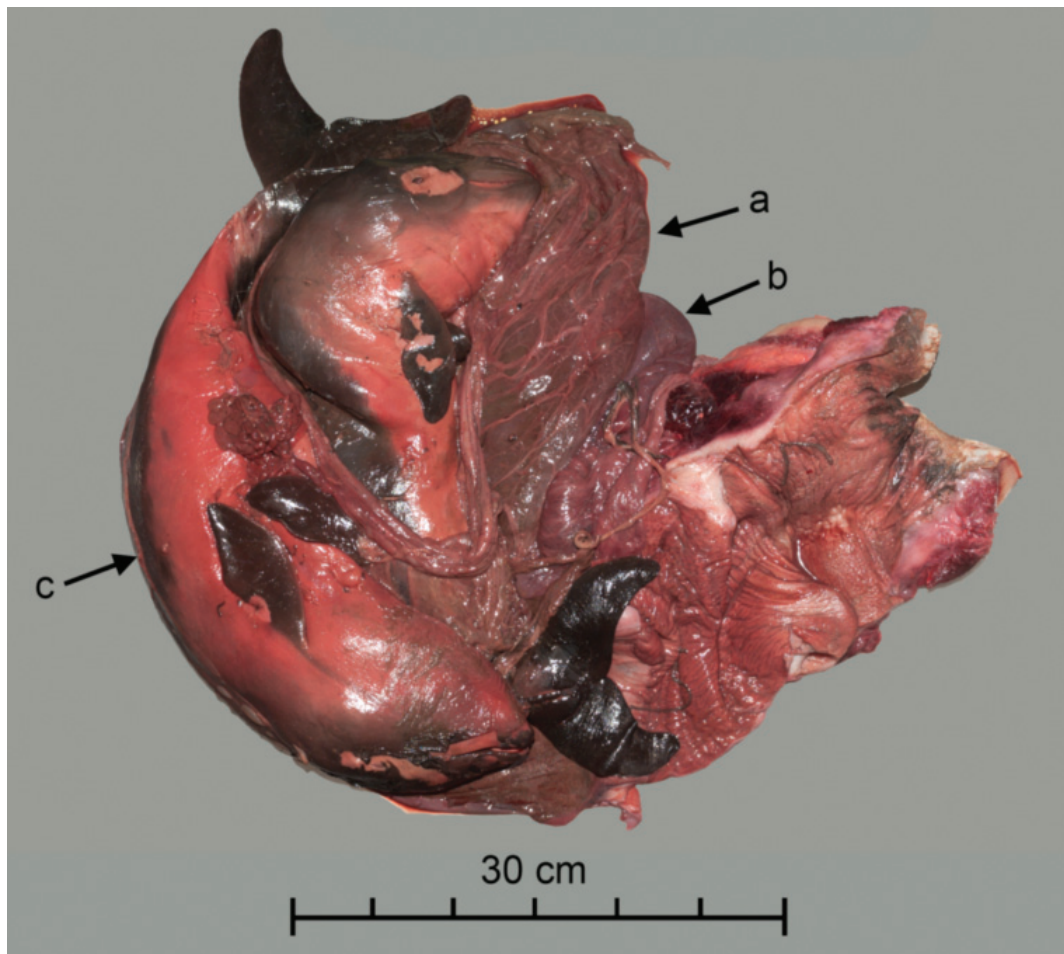


Figure 2. Twin harbor porpoises in uterus, with *a* indicating the placenta, *b* indicating the right uterus horn, and *c* indicating the left uterus horn

porpoises in Japan is from May to June, while the reported twin fetuses were found in October and were also smaller than singletons found during the same period (Nakamatsu, 2001). The birth of living twins has never been reported for Phocoenidae. It is possible that, as is seen in horses, harbor porpoise twins are more likely to undergo intra-uterine death, abortion, mummification, or, if born alive, neonatal death.

Acknowledgments

We would like to thank the staff of Ecomare and IMARES for their help collecting this porpoise. Also, we thank our colleagues who kindly provided us with the pregnancy rates they found in stranded harbor porpoises in bordering countries: Andrew Brownlow and Nick Davison (Scottish Marine Animal Stranding Scheme), Ursula Siebert

(University of Veterinary Medicine Hannover), and Thierry Jauniaux (MARIN Marine Animals Research & Intervention Network, University of Liège). Figures were adjusted by Joop Fama from Multimedia (Faculty of Veterinary Medicine, Utrecht University), and the text was proofread for the language by Rachel Thomas. This research was funded by the Dutch Ministry of Economic Affairs (140000353).

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