Malformations in brown bears (Ursus arctos)

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We present the rare findings of malformations in Swedish brown bears, according to the wildlife disease monitoring 1948-2014.

Introduction
There are very few published reports of congenital malformations in wild or captive bears. Most describe findings in single animals. Here we present the accumulated cases of malformations diagnosed in free-ranging brown bears (Ursus arctos).

According to Swedish legislation, all dead wild brown bears found dead or put down, are brought to the National Veterinary Institute (SVA) for necropsy and sampling. This is a part of the wildlife disease monitoring in Sweden and gives a good opportunity to find and describe also more rare diseases or lesions.

Methods and material
The SVA pathology databases were searched for complete carcass necropsies of Swedish brown bears, both free-ranging and from zoos, and filtered for diagnoses categorized as malformations.

Fig 1. Dead brown bears are weighed and measured before necropsy and sampling, according to standard protocols at the National Veterinary Institute (SVA) in Sweden.

Results and discussion
Over 650 wild brown bears have been necropsied at SVA since 1948. Four cases of congenital malformations, described below, have been documented so far.

Fallot’s tetralogy
A congenital heart malformation with all four changes typical of Fallot’s tetralogy was noted in a seven year old female bear killed by intraspecific aggression, probably by an adult male bear. The female had bred, but no cubs were observed at the time of death. This was the first known report of congenital heart malformation in bears.

Fig 2. Brown bear heart, fixed in formalin, showing the four pathologic changes of Fallot’s tetralogy: 1) The aorta (A) is transposed, with a white tube showing the limited flow of blood from the left ventricle to the aorta. 2) Ventricular septum defect (VSD), visualized with a white tube passing through the defect in the interventricular wall. 3) Abnormally thickened right ventricular (RV) wall, instead for viewing. 4) Stenosis (S) of the pulmonary artery due to the tissue response to the increased blood flow shunted from the left ventricle. Horizontal bar = 1 cm.

Photo: E. Ågren. Printed with permission from the Journal of Wildlife diseases.

Fig 3. Brown bear trachea, formalin-fixed, opened along the dorsal ligament, showing lower part of the trachea with the bronchial branching at bottom. The tracheal web is seen as a mucosal fold originating from the dorsal ligament (large arrow), lengthwise bisecting the trachea lumen and attaching to the ventral surface of the trachea in a more web-like pattern (small arrows). Photo: E. Ågren.

Fig 4. Brown bear female, necropsy photo of the four thoracic mammary glands (two gland in the inguinal area not shown). Supernumerary nipple on the upper right side mammary gland (arrow), with two nipples instead of one nipple. One of the two cases noted in Swedish brown bears. Photo: Erik Ågren.

Underlying causes?
Inbreeding depression has not been documented in the Scandinavian wild brown bear population, so these single reports of congenital malformations are presently considered as spontaneous cases.

Selected references


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Conclusions
Malformations in brown bears are:
- very rare findings
- considered to occur spontaneously
- not a risk for the bear population