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The topography of the coronary arteries in the Common Seal (*phoca vitulina vitulina*)

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In 58 hearts of the common seal (*Phoca vitulina vitulina*), 95% of the hearts display the R-type of the coronary artery circulation, while in 5% the L-type is present.

The findings coroborate the work of Drabek (1975) in lobodontine seals, but disagree with those in the northern seals described by Bürow (1838) and Marschner (1901).

The absence of the origin of the left coronary artery in 5% of the cases makes the common seal vulnerable when exposed to difficult circumstances.

Introduction

Since Bürow (1838) described the pattern of the coronary arteries in a northern seal (*Phoca littora*), little has been published about this subject. Marschner (1901) recorded in *Phoca littora* three cases and Drabek (1975) found the coronary artery system in 10 lobodontine seals typically mammalian, it varied slightly from that of the dog. Contrary to the general literature (Berg: 1965) the type of the coronary system is not in discussion in the studies mentioned.

The aim of this study is to investigate the topography of the coronary arteries in the common seal (*Phoca vitulina vitulina*), to classify the findings of the types of pattern of the coronary arteries and to discuss the results with the current literature.

Material and technics

Fifty eight hearts of the common seal have been investigated. These hearts were derived from animals found dead. The post mortem examination took place 1 to 10 days or longer after death. So the hearts were in a bad condition, the coronary arteries were filled with blood. An X ray examination was not practicable. Before the dissection of the arteries the hearts were fixed in 4% formaldehyde.

Results

In the 58 hearts two types of the pattern of the coronary arteries have been found.

The right type (R-type)—the ramus (r.) interventricularis subsinuosis is drained by the right coronary artery—is present in 55 cases or 95% (Figure 1).

The left type (L-type)—the r. interventricularis subsinuosis is drained by the left coronary artery—is present in 3 cases or 5% (Figure 4).

The 55 cases of the R-type may be subdivided in three groups: 1) the normal R-type in 36 cases or 62% (Figure 1); 2) the normal R-type plus a r. conalis—r. interventricularis paraconalis is drained by the r. conalis of the right coronary artery—in 15 cases or 26% (Figure 2) and 3) the normal R-type plus an absence of the origin of the left coronary artery—the complete arterial circulation of the heart is drained by the right coronary artery—in 4 cases or 7% (v. Nie and v.d. Kamp, 1983).

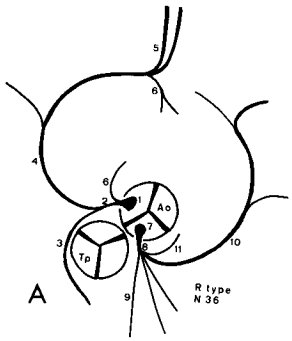
The diameter of the origin of the right coronary artery exceeds that of the left coronary artery in 32 cases or 55%.

In all cases a septal artery posterior to the atrioventricular node is present.

Discussion

The findings in the present study—a predomination of the R-type (95%) in the pattern of the coronary arteries—are in contrast with the findings of Bürow (1838) and those of Marschner (1901). These authors, both studying three seals, described the L-type of the coronary artery circulation in all cases. The cause of this difference may be the number of the investigated hearts. The presented results corroborate the findings of Drabek (1975) in 10 lobodontine seals with exception of the diameter of the origin of both the coronary arteries. In the present study the diameter of the right coronary artery exceeded in 55% of the cases those of the left one, in Drabek's study the figures are reversed. The small number of cases in both the studies however don't lead to a final conclusion.

A predomination of the R-type of the coronary circulation is described in man—95%—by James (1972) and in pigs—100%—by Berg (1965). A predomination of the L-type has been found in the



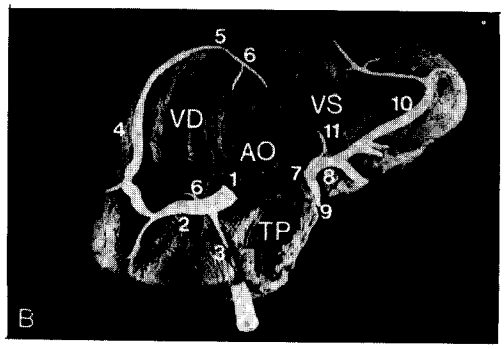
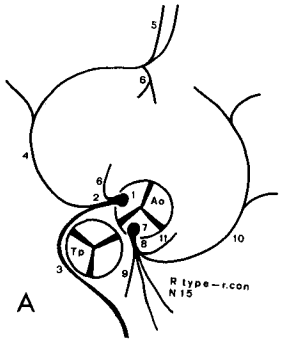


Fig. 1



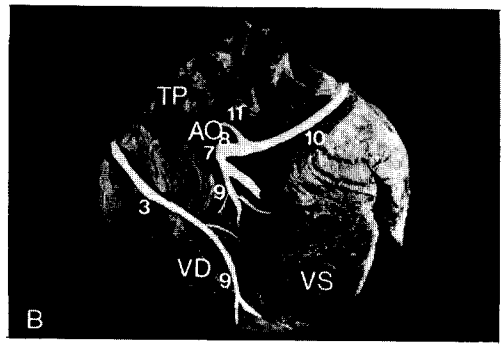
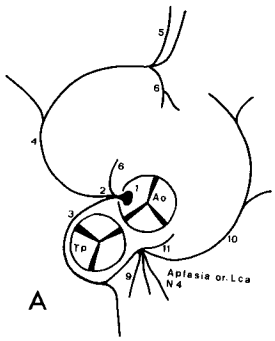


Fig. 2



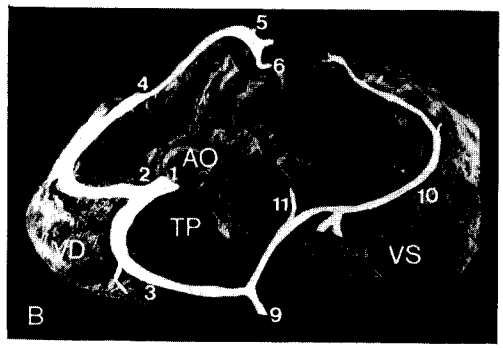
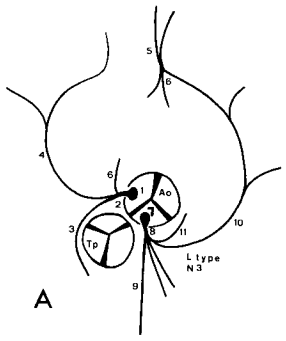


Fig. 3



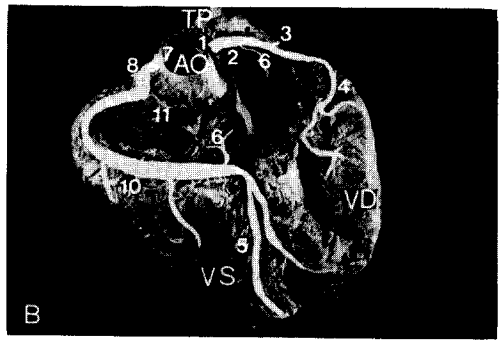


Fig. 4

dog—60%—by Brouwer (1963) and in most ruminants—percentage unknown—refered by Berg (1965).

In Cetacea the situation is somewhat confusing. Rowlatt and Gaskin (1975), reporting on 36 hearts of the harbour porpoise (*Phocaena phocaena*), found a predominant R-type. Exact figures however are not given. A predominant R-type is found too in a heart of a bottlenosed dolphin (*Tursiops truncatus*) (Cave 1977). In whales the specific pattern of the coronary arteries and the great number of anastomoses between these arteries especially in the region of the sulcus interventricularis subsinuosis make a discussion of the literature (Truex c.s., 1961) irrelevant in the present context.

The physiological relevancy of these morphological items is uncertain, since the normal function of the heart is independent of the type of pattern of the coronary artery circulation. The absence of the origin of one of the coronary arteries may be pathogenic in cases of emergency (Edwards, 1960), so the high percentage—5%—of absence of the origin of the left coronary artery in the common seal, makes a lot of these animals vulnerable in difficult circumstances.

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AO	Aorta
TP	pulmonary trunk
VD	ventriculus dexter
VS	ventriculus sinister
1	origin right coronary artery
2	right coronary artery (r.c.a.)
3	r. conalis (r. = ramus)
4	r. circumflexus r.c.a.
5	r. interventricularis subsinuosis
6	r. septalis
7	origin left coronary artery
8	left coronary artery (l.c.a.)
9	r. interventricularis paraconalis
10	r. circumflexus l.c.a.
11	r. atrialis

Figure 1. R-type of the coronary circulation.

Figure 2. R-type of the coronary circulation plus a r. conalis draining the r. interventricularis paraconalis.

Figure 3. R-type of the coronary circulation plus an aplasia of the origin of the left coronary artery.

Figure 4. L-type of the coronary circulation.