Atrophic rhinitis (AR) must still be considered as an anatomopathological entity. The age of the piglets at the moment of infection is very important for the subsequent development of the characteristic lesions which primarily consist in a decrease in bone formation.

Indeed, the reactivity is maximal before the 3rd-4th first week of age. This particular reactivity of the piglets has been differently interpreted; one interpretation is the more rapidly osteous turn-over of the nasal ventral turbinate (NVT). In any case, until now nobody has studied the particular growth of the NVT.

We investigated the kinetics of calcification of its different parts between birth and 6 weeks of life by fluorescent microscopy and microangiography.

**MATERIAL AND METHODS**

1.-Animals. In a litter of piglets naturally reared under a Landrace gilt purchased from a herd free of AR, 6 piglets were selected for the normal curve of growth.

2.-Indicator for the complexometric determination of calcium. The initial marker was oxytetracycline (OTC) 0.6 mg/kg/day and the final marker was Alizarine red S (ARS) 0.6 mg/kg/day. The experimental design adopted for the injection of piglet numbers was summarized in Table 1.

<table>
<thead>
<tr>
<th>Piglet no.</th>
<th>Injection (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 3 4 6</td>
</tr>
<tr>
<td>2</td>
<td>1 2 4 5 6</td>
</tr>
<tr>
<td>3</td>
<td>1 2 3 4 6</td>
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<td>4</td>
<td>1 2 3 4 5 6</td>
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<tr>
<td>5</td>
<td>1 2 3 4 5 6</td>
</tr>
<tr>
<td>6</td>
<td>1 2 3 4 6</td>
</tr>
</tbody>
</table>

C.-Seven cross-sections in each undecalciﬁed nose were made at different levels: the interval between the third incisor tooth and the canine tooth (C), the canine tooth (C), the incisor tooth (PM1), the rostral (R) and caudal (C) extremities of the 2nd and 3rd premolar teeth (PM2, PM3, PM4). The sections were brought to a thickness of 50 micrometers. Roentgenographs were made and the sections were examined under UV light as previously described.

**RESULTS**

The topographic relations of the different parts of the nasal ventral turbinals evolve and itself modify between birth and 6 weeks of life.

1.-Articular lamina (AL)

Its osseous rostral extremity is situated at the level of the PM1 at birth and reaches, six weeks later, the level of C.

This particularly important rostral osseous growth is accompanied with a relative movement in direction of the palate. Behind, growth slows down and is palato-lateral directed.

2.-Transverse lamina (TL)

During the 3 first weeks of life, the region of the TL situated in front of the PM2 grows rapidly in direction of the palate. From the 4th week onwards, only the rostral part of TL till the level of C remains this rapid growth. Behind the C, the intensity of the osseous turn-over falls down and takes place in direction of the palate in the lateral extremity of the TL. However, during the 4th week, the direction of the growth of the medial extremity of the TL changes, so that the medial extremity undergoes a relative shift in direction of the frontal bones. This rotation movement does not reach the caudal extremity of the TL, which grows in direction of the palate in order to permit the formation of the caudal blind alley.

3.-Scrolls

The relative volume occupied by the scrolls in the nasal cavities increases with the age of the piglets.

The attaching area of the scrolls to the TL presents a rapid medial growth only during the two first weeks of life and only in the region situated in front of the PM1.

Elsewhere and later, the attaching area is particularly stable.

During the two first weeks, the palatal and frontal scrolls, except the distal third of the curved portion with large radius of the frontal scrolls grow rapidly. The growth is eccentric and the distal extremities grows longer, involving an relative increase of the dimensions of the scrolls in comparison with the nasal cavities. From the rostral extremity of the PM1, growth becomes concentric in the frontal scroll from the distal third of its large radius curved portion to its distal extremity.

From the third week of life, the growth in the scrolled area slows down in areas which increase in the rostro-caudal direction. In the frontal extremity, the slow growth is limited to the large radius curved portion of the palatoglossal scroll. Behind, at the level of the PM1, it extends also in the distal third of the large radius curved portion of the frontal scroll. Finally, at the level of the caudal extremity of the PM2, growth is slow in all the areas of the scrolls, except in the small radius curved portion of the frontal scroll. The direction of the growth is also concentric from the distal third of the portion of the frontal scroll with large curvature radius to the distal extremity, but only from the rostral extremity of the PM2, which permits by this way a slow unrolling of the large radius curved portion of the frontal scroll.

**DISCUSSION AND CONCLUSIONS**

1.- Microangiographic analysis associated with the fluorescence microscopy of undecalciﬁed bones of animals who received different fluorescent calcification markers is presently the most suitable method to study growth phenomena and the remodelling of the squamous tissues.

2.- Nevertheless, in spite of the precision of today’s methods, we can only observe the growth of the NVT. Microscopic examination does not provide enough information to understand the mechanisms responsible of that growth and their eventually disorders.

3.- The NVT, contrary to the dorsal turbinals, is an independent bone and is maintained by few cartilaginous bones and is totally deprived of muscular influences. The turbinates’ growth is thus independant of its neighbours. This suggests the existence of a proper regulatory mechanism. For these reasons, the determination of the growth of the NVT is probably of genetic origin.

4.- The prominent lesions of AR in the rostral part of the NVT reported previously can be explained by the more important osteous turn-over in the same areas during the two first weeks of life. Consequently, every physiopathological process interfering with the intensive remodelling of the cartilaginous bones can lead to the development of the characteristic lesions of AR.

**Selected references**

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