# Influence of ovariectomy on vascularisation of thyroid gland in female dogs - preliminary study

Justyna Sokołowska[1], Alicja Krzyżewska-Młodawska[2], Kaja Urbańska1, Andrzej Max[2]
[1]Department of Morphological Sciences, [2]Department of Small Animal Diseases with Clinic, Faculty of Veterinary Medicine, Warsaw University of Life Sciences - SGGW, Warsaw, Poland

## Objective

Gonadectomy is the most common method of contraception in dogs. The influence of disturbances of thyroid activity on gonadal function is well described, however little is known about inverted relationships. Results of human studies indicate that estrogens affect the blood flow in thyroid gland during menstrual cycle. Moreover blood flow is significantly lower before puberty and in menopause than during reproductive period. Similar situation may occur in female dogs. Taking into account that ovariectomy resembles menopause in women it can be supposed that estrogen deficiency after gonadal resection leads to decrease of blood flow in thyroid gland and affects its function.

## Aim

The aim of this study was to compare the degree of vascularisation of thyroid gland in castrated and intact female dogs.

## Methods

Twelve thyroid glands collected during necropsy from female dogs without clinical signs of thyroid gland dysfunction were included in this study. Animals were divided into 2 groups: intact (n=6) and castrated (n=6) females. All specimens were fixed in 10% neutral buffered formalin and processed by common paraffin technique. The degree of thyroid gland vascularisation was assessed on the slides stained with anti-factor VIII mouse monoclonal antibody using computed digital image analysis. The following parameters were calculated: number of vessels, vessel perimeter and vessel area. In all cases triple counting of all examined parameters in 10 visual fields (40x) were performed.

## Results

Number of vessels, perimeter and area of vessels in thyroid glands of intact biches

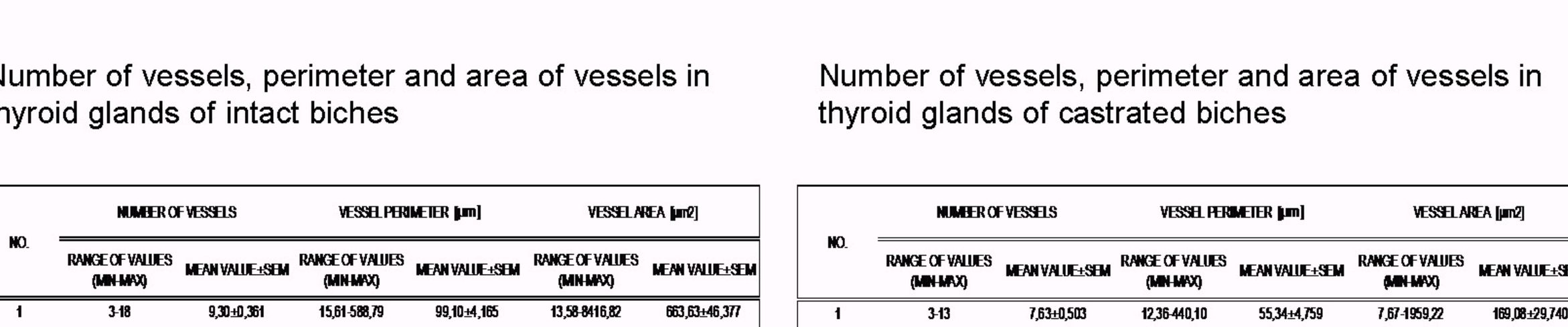
| NO. | NUMBER OF VESSELS | | VESSEL PERIMETER [µm] | | VESSEL AREA [µm2] | |
|---|---|---|---|---|---|---|
| | RANGE OF VALUES (MIN-MAX) | MEAN VALUE±SEM | RANGE OF VALUES (MIN-MAX) | MEAN VALUE±SEM | RANGE OF VALUES (MIN-MAX) | MEAN VALUE±SEM |
| 1 | 3-18 | 9,30±0,361 | 15,61-588,79 | 99,10±4,165 | 13,58-8416,82 | 663,63±46,377 |
| 2 | 2-11 | 6,37±0,404 | 0,86-469,89 | 85,06±14,287 | 9,30-5407,88 | 580,02±364,369 |
| 3 | 14-37 | 24,73±2,483 | 9,85-445,16 | 45,79±1,571 | 5,86-7719,28 | 144,30±33,527 |
| 4 | 14-40 | 28,00±1,054 | 11,62-409,18 | 55,89±5,199 | 8,28-3994,30 | 175,93±33,639 |
| 5 | 22-51 | 31,80±0,964 | 12-15-508,22 | 50,88±1,363 | 11,2-6092,37 | 135,24±5,070 |
| 6 | 15-49 | 30,47±1,290 | 11,82-234,17 | 41,37±4,407 | 7,58-2535,08 | 88,23±19,731 |
| TOTAL | 6,37-31-88 | 21,78±4,533 | 41-37-99,18 | 63,81±9,576* | 88,23-663,63 | 297,89±183,648* |

p≤0,05

Number of vessels, perimeter and area of vessels in thyroid glands of castrated biches

| NO. | NUMBER OF VESSELS | | VESSEL PERIMETER [µm] | | VESSEL AREA [µm2] | |
|---|---|---|---|---|---|---|
| | RANGE OF VALUES (MIN-MAX) | MEAN VALUE±SEM | RANGE OF VALUES (MIN-MAX) | MEAN VALUE±SEM | RANGE OF VALUES (MIN-MAX) | MEAN VALUE±SEM |
| 1 | 3-13 | 7,63±0,503 | 12,36-440,10 | 55,34±4,759 | 7,67-1959,22 | 169,08±29,740 |
| 2 | 3-13 | 7,80±0,964 | 12,00-643,80 | 58,95±11,844 | 7,07-6048,22 | 255,75±85,076 |
| 3 | 13-30 | 19,70±2,885 | 12,34-158,09 | 34,00±0,128 | 7,64-823,73 | 62,94±2,040 |
| 4 | 17-41 | 28,00±3,483 | 12,46183,64 | 38,01±2,070 | 6,89-770,49 | 59,61±5,609 |
| 5 | 23-47 | 33,27±1,955 | 13,97-315,6 | 44,17±3,446 | 1,95-1333,3 | 119,23±16,760 |
| 6 | 11-28 | 18,90±1,127 | 11,19-197,4 | 43,87±3,400 | 7,03-1266,83 | 95,26±11,300 |
| TOTAL | 7,63-28,00 | 19,22±4,240 | 34,00-58,95 | 45,72±3,968* | 59,61-255,75 | 126,978±38,583* |

p≤0,05



Expression of anti-factor VIII antibody in endothelial cells of thyroid glands

## Conclusion

The results have shown tendency to decrease vascularisation of thyroid glands in castrated female dogs in comparison to intact individuals. However, further study of larger groups of animals is needed to confirm this relationship.