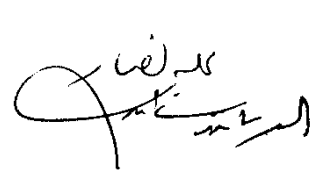
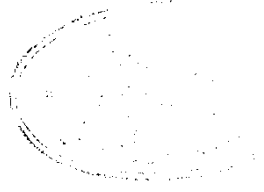


COMPARATIVE STUDY
OF THE BRONCHIAL TREE IN LUNGS
OF THE ALLIED ADULT MAMMALS

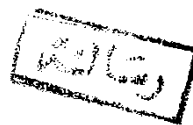
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INTRODUCTION

INTRODUCTION

The anatomy of the brochial tree in human was thouroughly investigated by many authors (Aeby, 1880; Appleton, 1944; Brock, 1946, Hinshaw, 1969 and Fraser, 1971).

On the other hand, the anatomy of the bronchial tree and its relation to the pulmonary vessels in both dog and cat was investigated by few authors (Tuker and Krementz, 1957; Felder, 1962; El Hagri, 1967, Nickel, Schummer and Seiferle, 1973 and El Gaafary, Osman and Munster, 1980).

The aim of the present study was to reinvestigate the bronchial tree and its relation to the pulmonary vessels in dog and cat as allied mammals belonging to carnivora and to compare them to other mammalian species. Both latex and celloidin corrosion techniques were used.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

1) LUNG MORPHOLOGY

A) IN DOG AND CAT :

Tucker and Krementz (1957), stated that the segmental bronchi and the lung tissues which they ventilated were known as the bronchopulmonary segments. The adjacent bronchopulmonary segments normally communicated with each other in the dog.

Miller, Christensen and Evans (1964), mentioned that in the dog, each lung was divided by deep fissures into three or four lobes. The right lung consisted of four lobes and the left lung consisted of three lobes.

Nickel, Schummer and Seiferle (1973), stated that the lung of the dog (Carnivora) presented very deep fissures which almost reach the bronchi. Only the left intralobar fissure was not quite so deep as the others. The apex of the right cranial lobe was rounded in the dog and was pointed in the cat. They also stated that in the dog, each lung was divided down to its root by an oblique fissure. Each lung was further divided by a deep fissure into three or four lobes. The surface of the adjacent lobes which lay in contact with each other were called the interlobar surfaces.

Miller et al. (1979), found that the adjacent broncho-pulmonary segments communicated with each other in the dog.

B) IN OTHER MAMMALS :

Schwein (1910), reported that the right lung of all domestic animals except the equines consisted of four lobes; apical, cardiac, intermediate and diaphragmatic. The left lung consisted of three lobes; apical, cardiac and diaphragmatic.

Bresson and Vladutin (1939), stated that in the domestic animals, the right lung was subdivided into fourteen segments while the left one was divided into twelve segments. They also stated that, in both right and left lungs, the cardiac and the intermediate lobes were represented by two segments while the diaphragmatic lobe was represented by ten segments.

Ellenberger and Baum (1943), stated that the right lung of the ruminants (cattle and sheep) consisted of five lobes as they considered the two parts of the right apical lobe as two separate lobes.

Bradley (1946), reported that the lungs of the horse were one continuous mass and the pulmonary fissures were absent. The right lung consisted of three lobes; apical, intermediate and diaphragmatic. The left lung consisted of two lobes; apical and diaphragmatic.

Stamp (1948), described the segmentation of the bovine lung according to the order of origin of the lobar bronchus. He mentioned that there were thirty-two segments in the right lung and twenty-four segments in the left one.

Farris and Griffith (1949), stated that, in the rat, there were four lobes in the right lung; superior, middle, inferior and median. The last lobe was noticed to accomodate the inferior vena cava and sometimes called the postcaval lobe. The left lung had only one lobe.

George (1951), stated that the right lung of the camel was made up of twelve segments while the left lung was made up of ten segments.

Turmel (1954), reported that the right lung of the ox, sheep and goat consisted of four lobes; cranial, middle, caudal and accessory lobes. The left lung consisted of two lobes; cranial and caudal lobes. The cranial lobes of both right and left lungs were divided into cranial and caudal parts.

Hare (1955), reported that, in the sheep, the pulmonary lobe was formed of a large area of pulmonary tissues ventilated by a large bronchus which arose either from the main bronchus or from the trachea. The pulmonary lobe was separated from the neighbouring lobes by interlobar fissures. He also stated that the right lung was larger than the left

one. The right lung consisted of four lobes; apical, cardiac, intermediate and diaphragmatic lobe. The left lung consisted of two lobes; apico-cardiac and diaphragmatic lobe. He added that the right apical lobe was divided into cranial and caudal parts while the left apico-cardiac lobe was divided into apical and cardiac parts. The right lung consisted of twelve segments while the left lung consisted of eight segments.

Bonfert (1956), stated that, in the domestic animals, the diaphragmatic lobe of both right and left lungs was divided by intersegmental connective tissue septa into four to five ventral and five to seven dorsal segments. Each of the right and left apical, middle and accessory lobe was represented by two segments.

Barone (1958), noted that the right lung of the horse consisted of four lobes and the left one consisted of three lobes. He also noticed that the cardiac lobe was located in the right and the left lungs but fused with the diaphragmatic ones.

Reymond (1958), stated that the segmentation of the diaphragmatic lobe in the sheep was similar to that of ox and goat. Each of the diaphragmatic lobe consisted of ten segments; four dorsal, four ventral and two medial.

Talanti (1958), stated that, in the pig, each lobe was

divided by connective tissue planes into segments except the left cardiac lobe which was undivided. He also stated that the diaphragmatic lobe of both right and left lungs consisted of five dorsal, five to six ventral and two to three ventro-medial bronchopulmonary segments. He also added that there were fourteen segments in the right lung and ten segments in the left one.

McLaughlin, Tyler and Canada (1961), divided the animals into three closely related groups; the first one included ox, sheep and pig as they had five lobes in the right lung and three lobes in the left one. The second group was represented by the dog, cat and monkey as they had four lobes in the right lung and three lobes in the left one. The third group included the horse and man as they had three lobes in the right lung and two lobes in the left one.

Hyman (1963), examined the lungs of mammals and concluded that the left lung was divided into three lobes; a smaller anterior, larger middle and posterior lobes. The large posterior lobe fitted very closely on the convex surface of the diaphragm. The right lung was larger than the left one and divided into anterior, middle and posterior lobes. The larger posterior lobe was subdivided into two lobules; medial and lateral.

Nanda and Patel (1968), mentioned that the right lung of the goat and buffalo had four lobes; apical, cardiac, diaphragmatic and accessory while the left one had two lobes; apico-cardiac and diaphragmatic.

Neurand, Wisdroff and Messow (1970), reported that the lobar division of the lung of pig was not constant. This might be due to the different stages of development of the interlobar fissures in the different individuals. The right lung was divided into four lobes; apical, cardiac, diaphragmatic and accessory one while the left lung was divided into three lobes; apical, cardiac and diaphragmatic.

Nickel, Schummer and Seiferle (1973), stated that the lung of the horse was characterized by the absence of fissures and each lung had a cranial and a caudal lobe. In addition, the right lung had an accessory lobe attached to the right caudal lobe. The lobulation in the horse was not very distinct. They also stated that the lobulation of the lung was conspicuous in the ox and almost completely absent in the sheep and visible only in the cranial and middle lobes in the goat. They also stated that the accessory lobe in the ruminants (ox) was attached to the middle lobe rather than to the caudal lobe as in other domestic animals. In the pig, the fissures were moderately deep and the lobulation was not so distinct as in the ox but visible over the entire surface of the lung.

Osman (1974), stated that the lung of the camel resembled the equine lung as it was not lobulated. The right lung consisted of three lobes; apical, intermediate and cardiaco-diaphragmatic ones while the left lung consisted of two lobes a small apical and cardiaco-diaphragmatic lobes. He also revealed that both apical lobes appeared to be separated from the rest of the lungs by the cardiac notches while the cardiac and diaphragmatic lobes were fused together to form the cardiaco-diaphragmatic lobes. In addition, the right lung had a small azygos lobe called the intermediate lobe. He also stated that the right lung consisted of sixteen segments and the left lung consisted of thirteen segments.

Hare (1975), stated that, in the sheep, each of the diaphragmatic lobe was divided into seven bronchopulmonary segments named; middle, ventral basal, lateral basal, dorsal basal, cranial dorsal, middle dorsal and caudal dorsal segments.

Sisson and Grossman (1975), described the lungs of the pigs and found that the right lung had four lobes; apical, cardiac, diaphragmatic and intermediate lobes. The left lung was regarded as having two or three lobes. The diaphragmatic lobe was usually separate. The part anterior to the fissure represented the apical and the cardiac lobes which were separated from each other by the cardiac notch. They postulated that the right lung of the dog was much larger than the left one. The right lung was divided into four lobes; apical,

cardiac, diaphragmatic and intermediate lobes by a deep fissure which extended to the root. The left lung was formed of two lobes; apical and diaphragmatic.

Nickel, Schummer and Seiferle (1976), reported that the segmentation of both right and left lungs of the camel was similar except that the accessory lobe on the left side was absent. The right lung consisted of sixteen segments while the left one consisted of fourteen segments.