Ministry of Higher Education and

Scientific Research

University of Al-Qadisiya

College of Veterinary Medicine

Effect of Low Level Laser Therapy on Second Degree Burns

A Research Project

Submitted to the council of Department of the Surgery and Obstetrics College of Veterinary Medicine/ University of Al-Qadisiyah in Partial Fulfillment of the Requirements for the Degree of Bachelor in Veterinary Medicine & Surgery

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Chapter One

1. Introduction:

Sheep and goats are very important source of food for humans and other important needs such as wool and milk production.so we need a high population of these two species to gate the above benefits. One of the most important and essential thing in this goal is support and develop the reproduction in sheep and goats .The placenta is one of the pregnancy structures that may decrease the ability of reproduction if they retained and inflamed. So the definite study of the placenta and its structure help to prevent their retention. One of these placental structure are the binucleate and multinucleate placental cells. Our study was conducted to deal these placental structures due to very little studies in this line .

Chapter two

2.Literature review:

2.1 Anatomy of placenta in sheep and goat:

The type of placenta in ruminants as classified according to the way the villi are distributed on the fetal chorion are grouped into multiple circumscribed areas, as in the ruminant, the placental arrangement is called *cotyledonary* (Noakes et. al,2001). A cotyledon is defined a placental unit of trophoplastic origin consisting of abundant blood vessels and connective tissue, in sheep there are between 90 and 100 cotyledons distributed across the surface of the chorion (Senger, 2005). The normal midgestation placenta of sheep and goats frequently has white foci on the chorion due to mineralization these findings must not be construed as lesions (Linklater and Smith, 1996). Formerly, the placentae were differentiated according to whether or not maternal tissue separated off with the fetal tissue at birth. Thus, of the domestic mammals, the placentae of the bitch and cat were said to be deciduate and those of the remainder non-deciduate (Noakes et. al,2001).

2.2 Histology of placenta in sheep and goats:

More recently, embryologists have favored Grossers (1909) division of placental types in which the degree of proximity of the maternal and fetal blood circulations is the criterion of classification. Such a concept recognizes the phagocytic property of the trophoblast, or chorionic epithelium, that may be exerted on tissues with which it comes in contact(Noakes et. al, 2001). The ruminant placenta was defined as syndesmochorial because Grosser considered that the uterine epithelium disappeared and the fetal trophectoderm was apposed directly to the maternal connective tissue, while some workers demonstrated that the uterine epithelium persisted (sometimes in a syncytial form) and therefore reclassified the ruminant placenta as epitheliochorial(Wooding, 1992). Ruminants have an epitheliochorial placenta, however, the endometrial epithelium transiently erodes and then regrows, causing intermittent exposure of the maternal capillaries to the chorionic epithelium, this type of placenta has been termed syndesmochorial (Senger, 2005).

2.3 The binucleate cells:

Binucleate cells are found in the fetal trophectodermal epithelium of all ruminant placentas, they are present in fairly constant proportions from plantation to parturition (Wooding, 1982). The morphological alterations of binucleate cells were similar in both early and late pregnancy in that they are few in number and non-vacuolated in sheep (Jafer et. al., 2013) and goats (Daham, 2014). The development of a selective stain for binucleate cells on electron microscope sections facilitated the demonstration that migration does ocuur in cows, deer goats, and sheep at all stages of pregnancy (Wooding, 1982). As their name implies, the binucleate cells are characterized as being quiet large and have two nuclei, binucleate giant cells appear at about day 14 in the sheep, these cells originate from trophoblast cells and are believed to be formed continuously throughout gestation (Senger,2005). The result of migration is fusion of binucleate cell with uterine epithelial cell or a syncytial layer, this fusion delivers the characteristic binucleate cell granules close to the maternal circulation while maintaining the trophoectodermal beriberi to other fetomaternal maternal exchange(Wooding, 1982). The binucleate giant cells are believed to transfer complex molecules from the fetal to the maternal placenta(Senger, 2005). The ruminant binucleate cell therefore seems to play a central role in forming the structures and secretions at the fetomaternal interface which may be crucial in establishing and maintaining pregnancy(Wooding, 1982).

2.4 Syncytial plaques(multinuclear cells):

Syncytial plaques are a placental multinuclear cells with small nuclei surrounded by a clear of cytoplasm, and in some stages of pregnancy are as a whole larger than the size of binucleate cells(Daham, 2014). It is thought that fully granulated binucleate cells migrate across the microvillar junction in the placenta, and fuse maternal uterine epithelial cells to form other transiently surviving trinucleate cells in cattle(Wooding and Beakers,

1987) or a persistent fetomaternal syncytia in sheep and goats(Lee et.al.,1986).

2.5 Hormones of placenta in sheep and goats:

in addition to serving as a metabolic exchange organ, the placenta serves as a transitory endocrine organ ,hormones from the placenta gain access to both the fetal and the maternal circulation, the placenta produces hormones that can stimulate ovarian functions, maintain pregnancy, influence fetal growth, stimulate mammary function and assist in parturition (Senger, 2005). Fetal placental cells exhibited greater ability to convert $PGF2\alpha$ to $PGE2$ than did a separated cells(Gross and Willisams, 1988). There is evidence that the binucleate cells secret placental lactogen, also these cells secrete pregnancy protein B, that are also called pregnancy associated glycoproteins (Senger, 2005). The binucleate giant cells are also important sites of steroidogenesis, producing progesterone and estrogen, particularly during the last part of gestation, in fact the peak of estrogen in most species signals the early parturient period(Senger, 2005).

Chapter three

Materials and methods:

3.1Collection and preparation of samples:

Placentoms were collected from 11 pregnant slaughtered sheep and goat at different gestation periods , from AL.Najaf slaughter house . Tissue specimens for microscopic examination were taken from the centers of the sampled placentoms . Immediately following collection ,the samples were fixed in 10% buffered neutral formalin for 24 h .Tissue specimens were dehydrated in a graded series of alcohol , cleared by xylol and embedded in paraffin .Histologic section were cut at 3-4 μm thickness ,Stained with hematoxylin and eosin(H&E) (1).

3.2 determination the period of gestation:

The size of fetus(es) of each of the collected samples were determined by crown to rump(C-R) . Then the period of gestation were determined according to (Richardson , by the following formula:

x=2.1(Y+17) as

x= gestation period in day , Y=the crown rump.

3.3 examination of slides:

Slide of all samples were examined under the microscopes under the power of 40x.

Chapter four

4. Results:

Our study for the morphological changes of placentome structures throughout different stages of gestation in sheep and goats revealed that in the period of day 44 of gestation the placentome showed that there is hyperplasia of epithelial cells , also several cells fused together to form syncytia, with prominent binucleate cells(figures 1,2,3,4). Similar changes are seen in day 50 of gestation with profuse binucleate cells in the placental tissue, with multiple syncytial structure and binucleate cells (figures4,5,6,7,8,9,10).

In day over 78 of gestation the changes were formation of syncytial structure with binucleate cells which were few in number (figures 11,12,13,14).

The changes in placental structures in the day over 119 of gestation were present of many small syncytia with prominent binucleate cells , the later were prominent and high numbers(figures15,16).

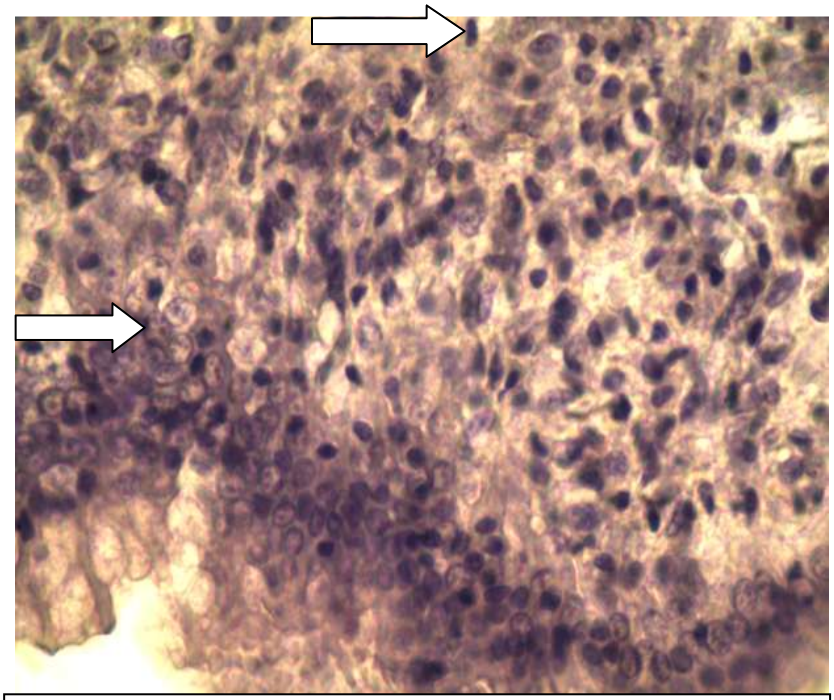

Figure 1. Day 44 of gestation(goat), hypoplasia of epithelial cells ,syncytia(lower arrow), and binucleate cells(upper arrow). 40x H&E.

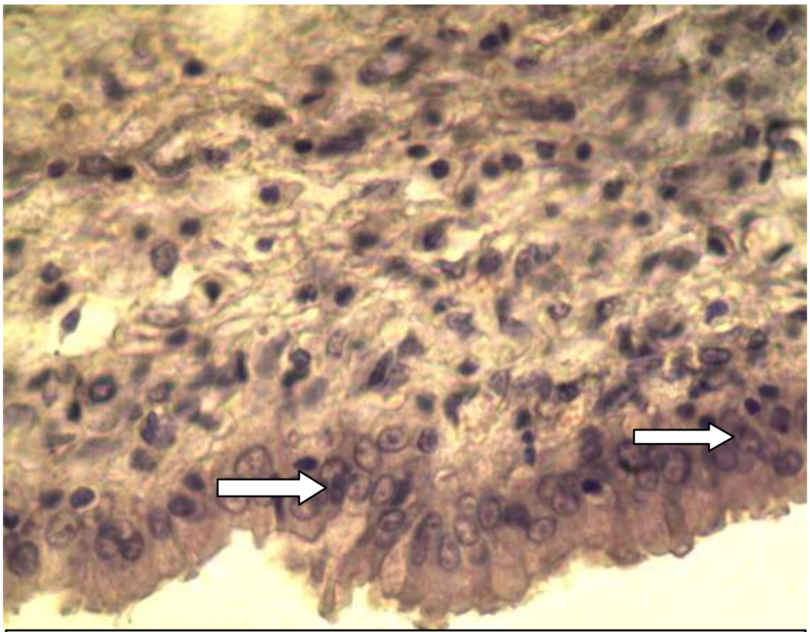

Figure2 . Day 44 of gestation (goat), clear binucleate cells(arrows) along the epithelium with small syncytia. 40x H&E.

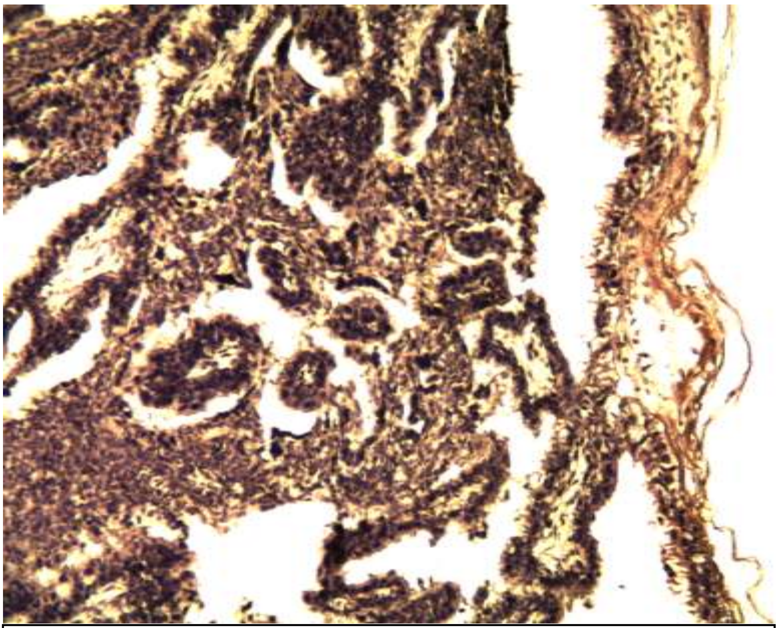

Figure 3. Day 44 of gestation (sheep), several syncytia along the placental tissue with binucleate cells. 10x H&E

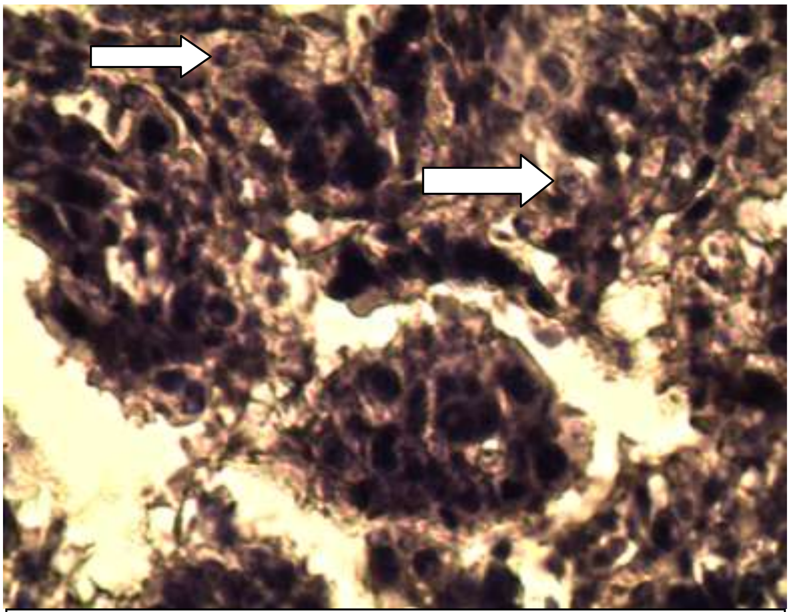

Figure 4. Day 44 of gestation(sheep), higher magnification clear large syncytia(lower arrow) with binucleate cells(upper arrow) in the placental tissue. 40x H&E.

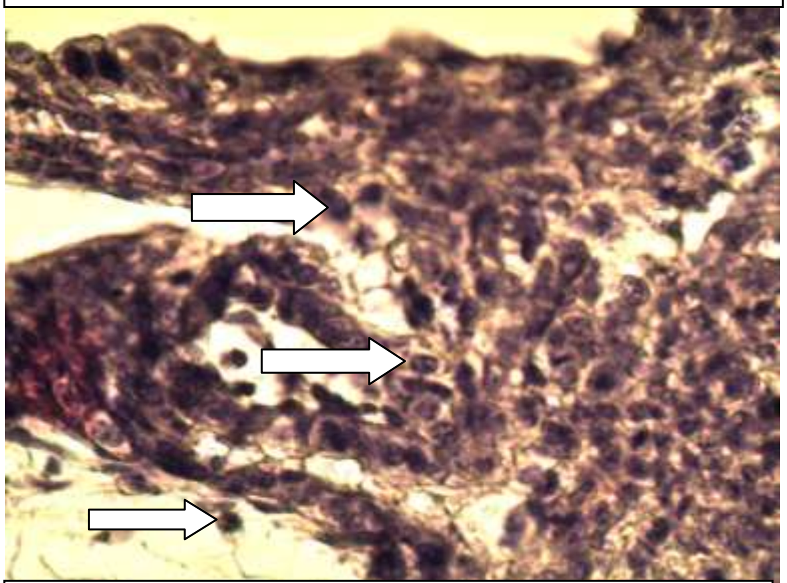

Figure 5. Day 50 of gestation (sheep), profuse binucleate cells(arrows) in the placental tissue. 40x H&E.

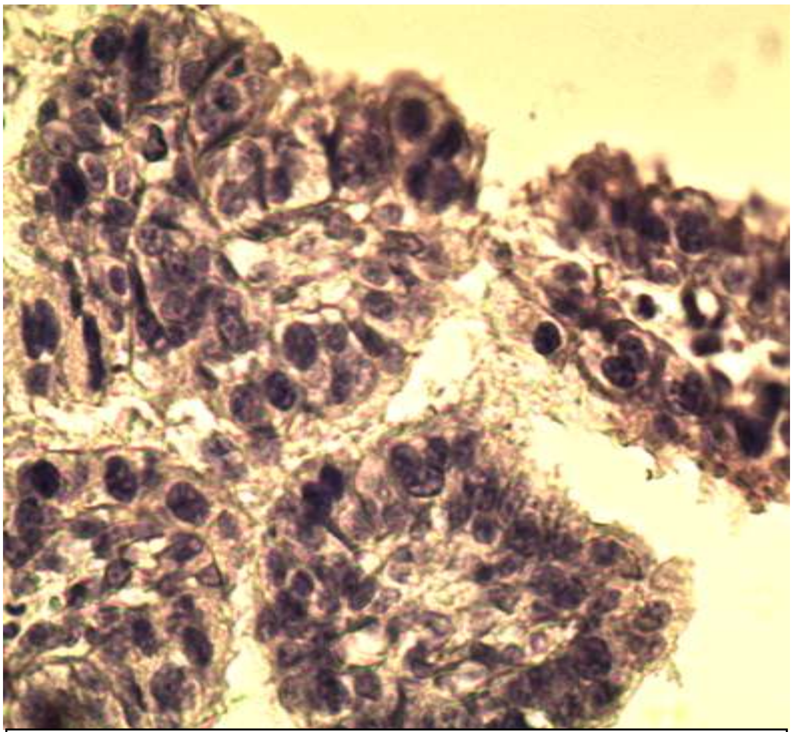

Figure 6. Day 50 of gestation (sheep), multiple syncytial structure with profuse binucleate cells. 40x H&E.

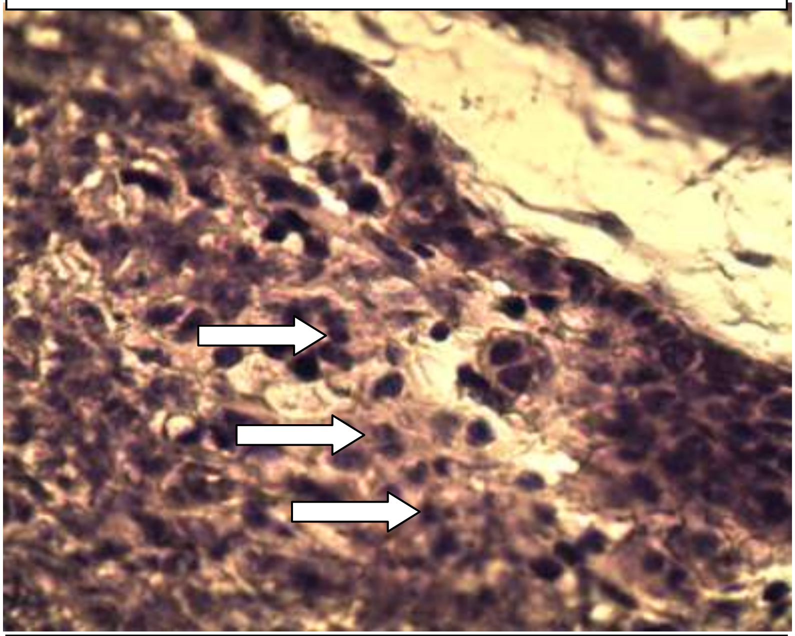

Figure 7. Day 51 of gestation (sheep), presence of high numbers of binucleate cells(arrows) in the placental tissue. 40x H&E.

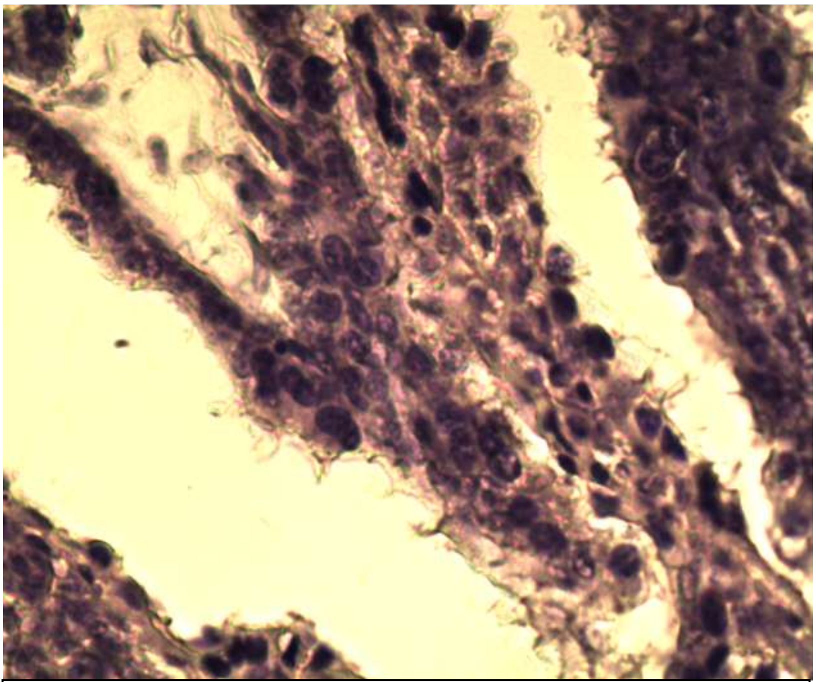

Figure 8. Day 51 of gestation (sheep), profuse binucleate cells with formation of syncytial structure. 40x H&E.

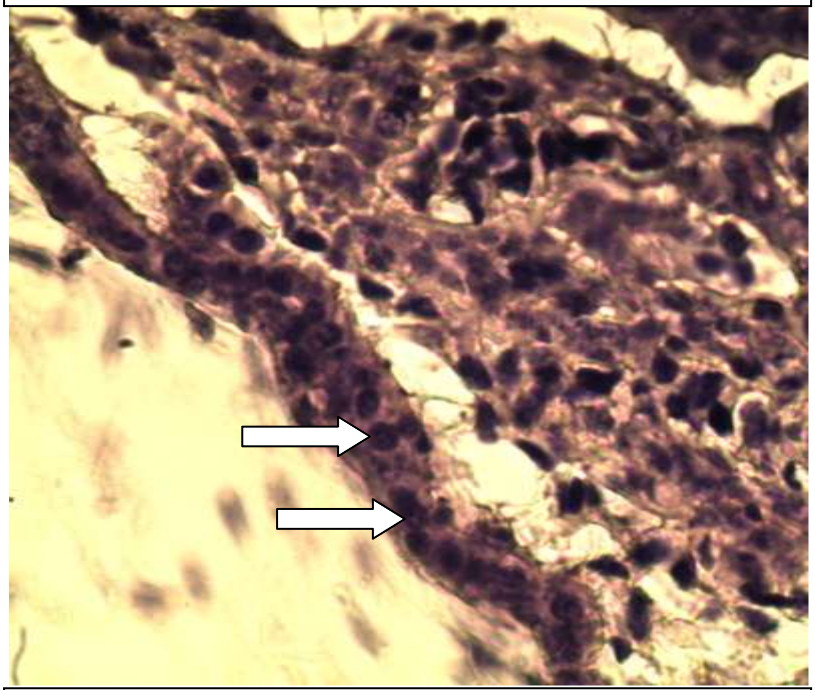

Figure 9. Day 51 of gestation (sheep), formation of syncytia(arrows) with presence of binucleate cells. 40x H&E.

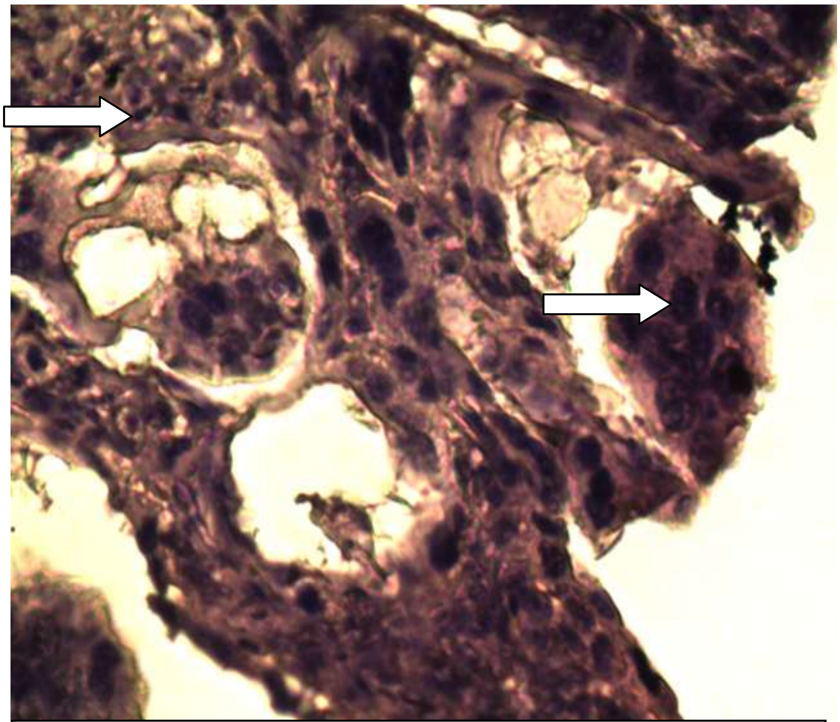

Figure 10. Day 51 of gestation (sheep), prominent syncytia(lower arrow) which formed from fusion of several cells together , with presence of binucleate cells(upper arrow). 40x H&E.

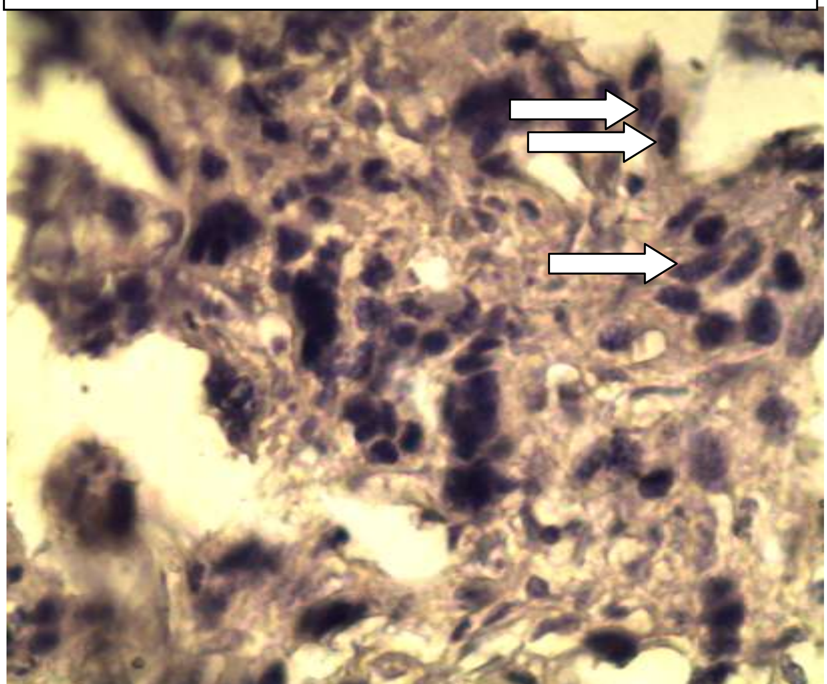

Figure 11. Day more than 78 of gestation (goat, twin), formation of many small syncytial structure(arrows) with few binucleate cell. 40x H&E.

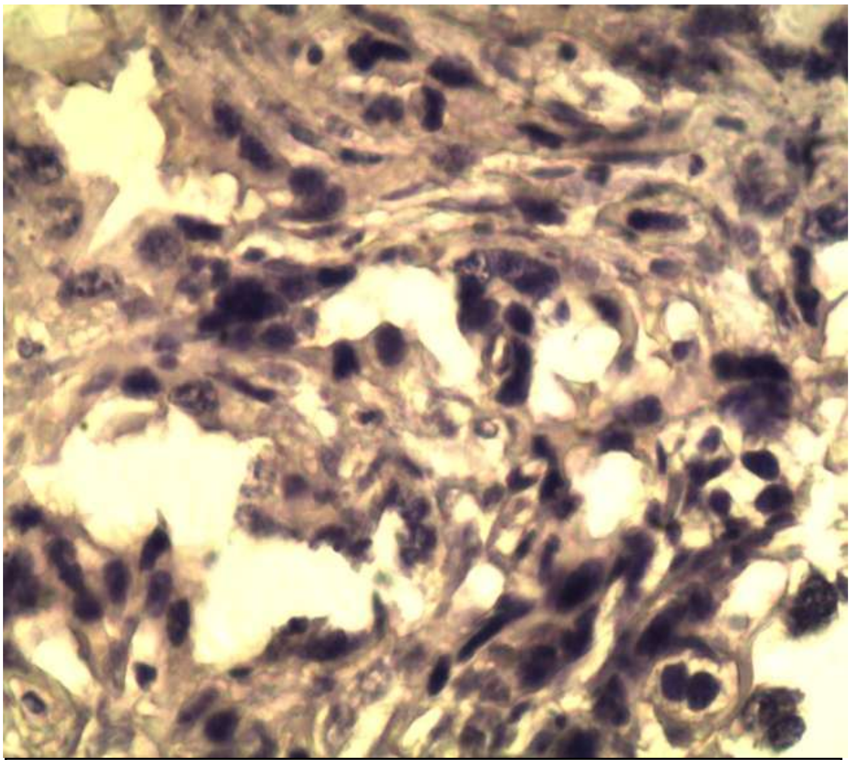

Figure 12. Day more than78 of gestation (goat, twin), presence of binucleate cells but with few number. 40x H&E.

Figure 13. Day more than 78 of gestation (goat , twin), prominent syncytia in the placental tissue with presence of binucleate cells(arrow). 40x H&E.

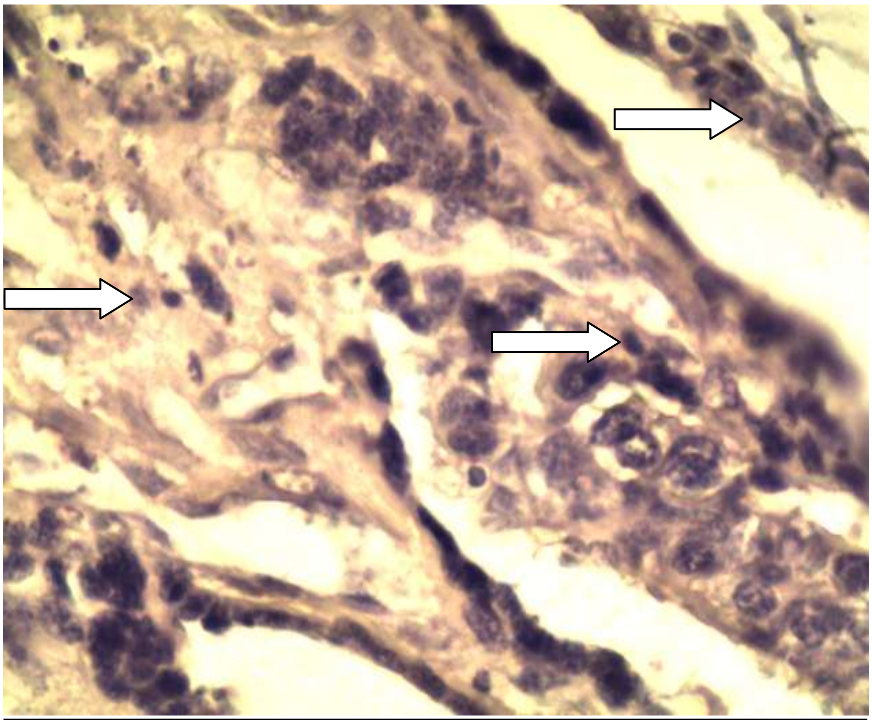

Figure 14. Day more than 78 of gestation (goat , twin), prominent syncytia with high numbers of binucleate cells(arrows). 40x H&E

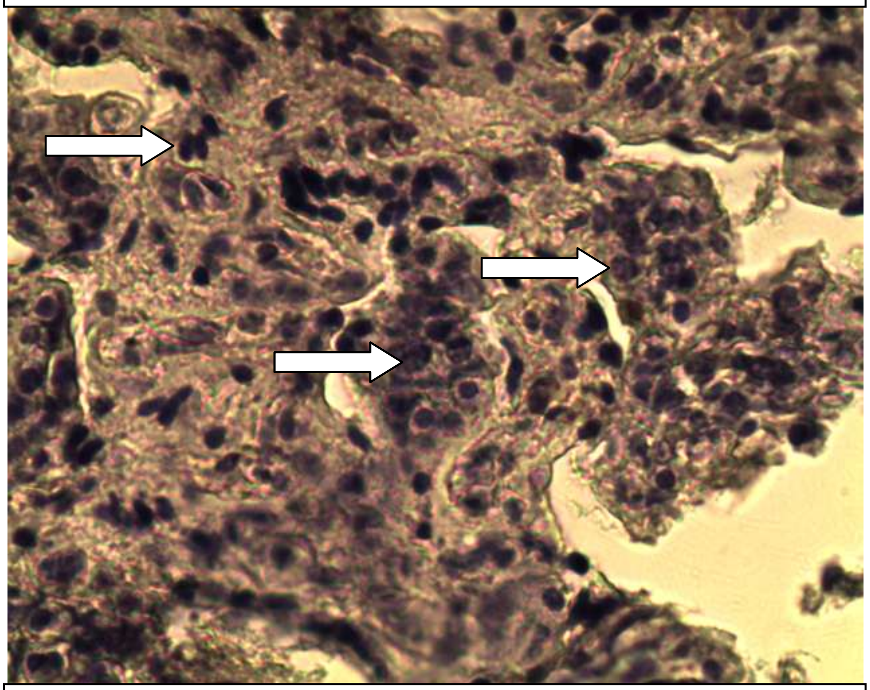

Figure 15. Day more than 119 of gestation (sheep), presence of many small syncytia with prominent binucleate cells. 40x H&E.

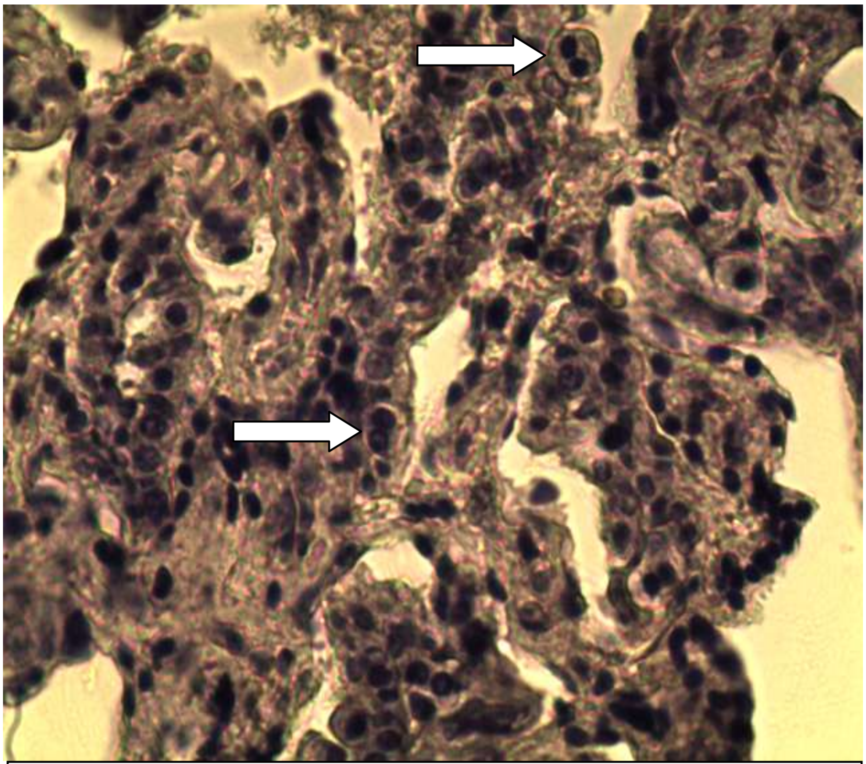

Figure 16. Day more than 119 of gestation (sheep), profuse and high numbers of binucleate cells(arrows). 40x H&E.

Chapter five

5. Discussion:

Our results revealed some changes in the formation and presence of binucleate cells and syncytial structures throughout different stages of pregnancy in sheep and goats especially in early and last months, these results are agree with the results of (Daham,2014; Jafer et.al, 2013,).

The results also agree with (Wooding,1982), in formation and presence of binucleate cells in the fetal trophectodermal epithelium of ruminant placentas , but disagree in that they are different in proportion throughout the different stages of gestation.

Our results also reveal that there is a decline in number of binucleate cells in the last stages of gestation. This results is similar to that of (Gross, et. al, 1991), who found that there is a decline in number and viability of binucleate giant cells peripartum if the placenta is released normally, and pointed that this decline in number of binucleate cells in peripartum period suggests an involvement of binucleate cells destruction in fetal membrane separation in the cow.

Results of the present study also agree with (Wooding, 1992), in that the ruminant binucleate cells are directly involved in the modification of the at implantation and continuing until term and the uterine epithelium persist but is modified to variable degree, depending on species, into a hybrid fetomaternal syncytium by the migration and fusion of the fetal binucleate cells with those of the uterine epithelium.

Chapter six

6.1 Conclusions:

1-our study reveal that there were several morphological alterations in binucleate and syncytial plaques in different stages of pregnancy in sheep and goats.

2-there were similarity in the morphology of binucleate and syncytial plaques during early and late pregnancy in sheep and goats.

6.2 Recommendations:

1-Studying the placentoms of other ruminants especially buffalo, to detect presence of binucleate cells and syncytia .

2-Studying the placenta of camel to detect presence of binucleate cells and syncytia.

3-Studying the structures of binucleate cells and syncytia by electron microscope for different animals.

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