Scholars LITERATURE

La Prensa Medica Argentina

Research Article

Volume 106 Issue 6

Histological and Histopathological Comparative Study for Placentae of an Aborted Ewe with Placentae of Normal Birth in Ewe

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Abstract

The present study was designed to show the histological architecture of the placenta after abortion in the ewe. Six placentae from normal gestation and normal birth, and six placentae from aborted ewe. The histological technique was done to complete the histological procedures, to obtain a slide with tissue, of the placenta, sectioned at 6 micrometer thickness, and stained by Hematoxylin and Eosin. The results revealed that abortion leads to the effect of the placenta in this case. The chorionic villi were containing cytotrophoblasts and syncytiotrophoblasts in a few numbers with the degenerated condition at the periphery of these villi and its core have congested blood vessels and lymphocytic infiltration with giant cells also seen.

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Citation: Al Bayati HHK, Hussein FA, Thamer IK, et al. (2020) Histological and Histopathological Comparative Study for Placentae of an Aborted Ewe with Placentae of Normal Birth in Ewe. Prensa Med Argent, Volume 106:6. 305.

Received: August 17, 2020; **Accepted:** August 31, 2020; **Published:** September 05, 2020

Introduction

Abortion and death among newborns cause sharp economic problems in ewes [1]. Therefore, must be identified abortion where is a case that the gestation is the arrest of early-stage, mid-stage, and late-stage or even at any time of pregnancy, the embryo or fetus when is aborted is usually under many factors or manifestations leading to expelling outside the uterus of a pregnant female, the mortality as an aborted fetus is 100% due to contamination of uterus with one of the microbial, viral, nutritional or even mechanical effect, endometritis is expected result, also retained placenta or placental lesion, also present, where that of poor nutrition of ewe lead to reduce conception and even embryonic lost and also lambing rate reduced [2], while the effect of bacterial and parasite causes abortion by such as (*Chlamydia abortus,* listeriosis, and *Toxoplasma gondii*) [1]. The clinical signs of Toxoplasmosis may be seen in the second stage of the trimester in pregnancy ewe because infected for the first time with exemplary symptoms include stillborn and feeble, predominately, mummified fetus and placental cotyledons on the placenta, with present "white spots" lesions are grossly seen on the wall of the placenta [3]. It was found that *Compylobacteriosis C.fetus*, *E.coli* also recorded inducing abortion in ewe and bird, survive for short time (days) outside the gut, in abortion causes suppurative placentitis and endometritis bronchopneumonia in the fetus, with hepatic lesion and the abortion, usually occur in last six weeks of gestation, the risk of infection of Compylobacteriosis (contaminated environments and moist, drying condition in building or at pasture, the ally also found other causes of abortion is Listeriosis are diagnosed by culture and diagnosed, isolated from fetal membranes, fetal stomach contents or fetal liver, its abortion induced at any stage of gestation [1].

The developing fetus inside the placenta (multifaceted) maintain and protect by this organ, all these include by nutrients transferring from mother and play important when it acts as a barrier for the fetus protect him from harmful effects like pathogens and the maternal immune system, as well as serving as an active endocrine organ capable of synthesizing and secreting a plethora of hormone growth factors, cytokines, and another bioactive productive product [4]. Dubey JP, et al. (2006) [5] described that the abnormalities structure of the placenta involves a reduction in, diameter and surface area, arterial number and villous decrease in several lumen size and branching.

Placental Histopathology

The lesion of placenta demonstrated the presence of suppurative placentitis by:

Gross Inspections: The chorionic epithelium in the affected tissue has been significantly disrupted, with or without an inflammation exudate attached to the surface, indicating substantial cell destruction. There was a thick layer of tightly packed, mixed inflammatory underneath the epithelial surface and contributed to damage to the basement membrane. Many were neutrophilic polymorphous and others were monocytes. Foci of haemorrhage scattered in the epithelium in different size and number with a present zone of inflammation surrounding the infected area. Oedematous fluid leading to chorioallantoic mesenchyme whole thicken of the chorioallantoic

mesenchyme, varying degrees of eosinophilia and contained hemorrhagic foci also present in the infected area with diffuse infiltrate of inflammatory cells [6].

The researches mentioned that the poor nutrition of ewe leads to reduced conception and even embryonic losses, also lambing rate [2]. And this data was confirmed by El-Hag FM, et al. [1998] [7] when they mentioned when they stated that additional feeding during maturation and at late pregnant ewes increases breeding efficiency, indicating highly significant rates and increases lower abortion lambing rate. While Hartley WJ, et al. (1954) [8] mentioned well recognized that toxoplasmosis causing intracellular protozoan parasite (Ovine toxoplasmosis) in many countries. Buxton D (1998) showed that the cat was the ultimate parasite-host and could excrete millions of *T. Gondii* oocyst which could last years. In the case of ovine toxoplasmosis, it is interesting to note that the multifocal necrosis white spot area in the placenta are characteristic of it [9]. More than 1.25 million lambs have been lost in Europe since 2003 [10]. *Chlamydophila abortion* in many rearing countries is a significant cause of ovine abortion [11]. Although, it is defined that the placental chorionic epithelial (trophoblastic cells) has initially formed the infection [12].

Research show well that placental damage caused by the release of maternal prostaglandin causes luteolysis and abortion in ewes and vaults in turn [5]. The placental structure abnormalities involve the reduction of the diameter of the arterial number and the surface area where the number, lumen and branching decrease [13]. Moreover, Luque L, et al. (2009) [14] describe that the *Salmonella enterica* which is uncommon in most countries was related to an outbreak of abortion in dairy ewes, in Southern Spain, it was found that the sources of infection were that infected pigeons due to the drinking water and feedstuff. The present study aimed to show that the effect of abortion on the histological structure of the placenta of the ewe which is aborted at different causes.

Materials and Methods

Six specimens of the placenta from the aborted ewe were taken and immediately washed in tap water and immersed in 10% formalin for 24 hours. Each one was sectioned into a segment of 0.05 cm thickness, placed in Bouins solution for fixation 24 hours, dehydrated in a graded alcohol series from 50%, 70%, 80%, 90% and 100% 4 hours for each step, then cleared in xylene two changes 2 hours for each step, embedded in paraffin and cut at 6-micrometer thickness using a manual microtome. The sections were stained by Haematoxylin and Eosin (H&E) and finally examined by a light microscope at different magnifications [15].

Results

The Normal Placenta

The placenta of the normal birth of ewe, demonstrated the presence of chorionic villi with a core of delicate C.T containing small blood vessels filled with blood and scattered WBC. The periphery of these villi is containing individual cytotrophoblasts, with syncytiotrophoblasts of smaller size and more in number (Figure 1). In a certain place, these chorionic villi were increased with WBC infiltration and minute foci of RBC outside the blood vessels. The macrophages also demonstrated in the core of villi and around it (Figure 2).

The Aborted Placenta

The core of the chorionic villi was containing many blood vessels with congestion, surrounded by multiple lymphocytes and

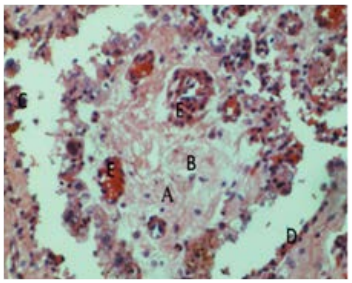

Figure 1: Chorionic villus (A), core of chorionic villus (B), cytotrophoblast (C), syncytiotrophoblast (D), blood capillaries (E), (H&E X20).

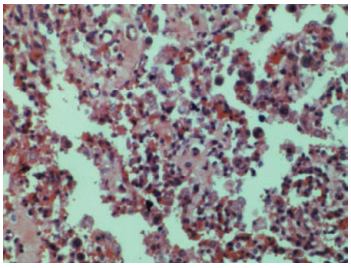

Figure 2: Lymphocytic infiltration in the core of chorionic villus with the presence of minute capillaries, (H&E X20).

macrophages (Figure 3). The placental membrane was condensed with CT, infiltrated with a great number of lymphocytic and other WBC aggregation, also the macrophages were easily detected in between that WBC and around the blood vessels (Figure 4). The mesenchymal membrane was seen well; its core was containing delicate fibers with mesenchymal cells. This tissue was surrounded by dense CT which appeared interrupted (Figure 5).

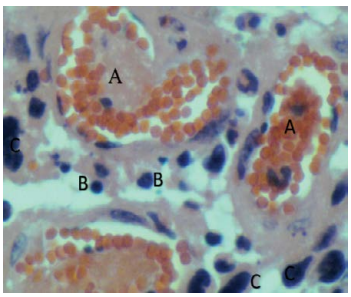

Figure 3: The core of chorionic villus demonstrating multiple BV filled with blood (A), lymphocytes (B), macrophage (C), (H&E X40).

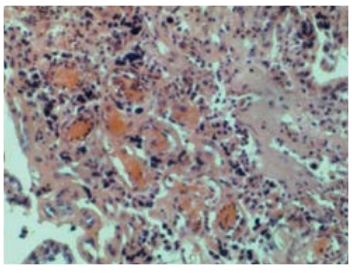

Figure 4: Placental membrane showing density of CT and intensive aggregation of WBC and macrophages surrounding the congested BV, (H&E X20).

This dense tissue had lymphocytic infiltration, macrophage, and plasma cells (Figure 6). The blood vessels were many and all of them were congested with blood that appeared outside the mesenchymal membrane with the diffusion of WBC and macrophages (Figure 7).

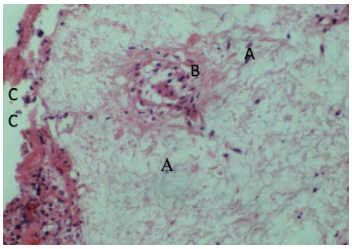

Figure 5: Mesenchymal membrane with delicate CT with mesenchymal cell (A), lymphocytic infiltration (B), interruption of edges of CT around mesenchymal membrane (C), (H&E X20).

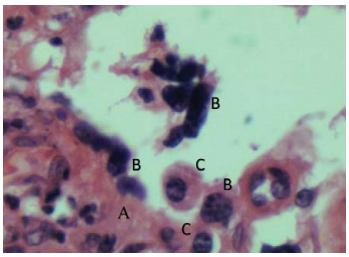

Figure 6: The edge of placental membrane crowded with lymphocytes (A), macrophages (B), plasma cells (C), (H&E X40).

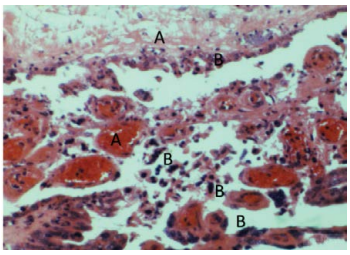

Figure 7: Sever congestion of B.V of the placental membrane (A), surrounded by macrophages (B), (H&E X20).

The chorionic villi also containing necrotic tissue associated with the blood clot tend to be bluish color surrounded by macrophages and lymphocytes (Figure 8). Cytotrophoblasts were noted at the periphery of the chorionic villi with a mass of syncythiotrophoblasts (Figure 9).

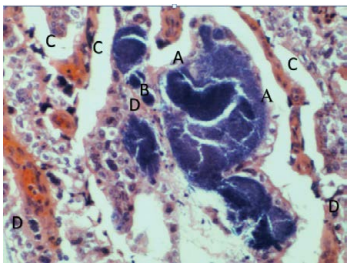

Figure 8: Necrotic tissue with a blood clot in the core of placental membrane (A), giant cells (B), loosening CT (C), lymphocytes (D), (H&E X20).

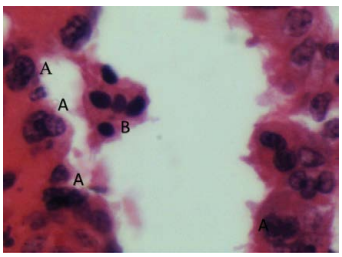

Figure 9: The periphery of the chorionic villi surrounded by cytotrophoblast and syncytiotrophoblast (B), (H&E X40).

Discussion

The present work was designed to demonstrate the histological architecture of the placenta at different times of abortion in ewe in comparison with the normal placenta of normal gestation and birth of the animal. The results of the normal revealed that the placenta was formed by the chorionic villi, surrounded by two types of cells which are cytotrophoblast (nutritive cells) and syncytiotrophoblast which form layers of cell series, surrounding the chorionic villi, and the core of these villi was formed by mesenchymal CT and blood vessels. These results were corresponding to that mentioned by Regnault TR, et al. (2002) [4] and Mescher AL, et al. (2013) [16].

In the case of an aborted fetus, the placenta was formed by a few cells of cytotrophoblast and degenerated cells of syncytiotrophoblast, also the core of villi was engorged with blood inside the chorionic blood vessels and outside (haemorrhage). The presence of macrophages and giant cells also demonstrated. So, these results are resembling that mentioned by Dubey JP, et al. (2006) [5]. Who described the role of a causative factor in cattle in the case of induction of abortion and the investigator Luque L, et al. (2009) [14] described the microbial insult which was the main factor in the case of abortion in the ewe. This means that the placenta was not far away from the destructive change of the agent which induce these histopathological changes. In the present study, our suggestion that the histological lesions of the placenta could begin firstly in the endometrium which considers the opposite side of the placenta, so any abnormal changes in the placenta could be followed after the abnormal change in the endometrium, and this concept corresponding to that mentioned by Buxton D, et al. (1998) [3], they attributed that the endometritis is the cardinal sign of abortion in ewe and goat. So these concepts and results of the present work.

We conclude That the aborted ewe leads to concerning its placenta, and the placenta of each aborted ewe had histological lesions such as degeneration of syncytiotrophoblast and cytotrophoblasts. The chorionic villi of aborted ewe had congestion its blood vessels with haemorrhage, so the whole placental membranes were affected in aborted ewe in comparison with the normal placenta which appeared with chorionic villi without degeneration of any type of its cells or blood vessels.

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