AJPMHS GLOBAL RESEARCH NETWORK

AMERICAN Journal of Pediatric Medicine and Health Sciences
Volume 3, Issue 2, 2025 ISSN (E): 2993-2149

Evaluation of the Expression Levels of Immunohistochemical Markers BCL-2, And KI-67 in Secondary Placental Insufficiency

Oripova Shakhnoza Asadullaevna, Sadiev Erali Samievich
Bukhara State Medical Institute named after Abu Ali Ibn Sina, Uzbekistan, Bukhara city, A. Navoi street

Abstract: In secondary placental insufficiency, inflammatory processes are often morphologically detected in placental tissue, each manifesting with specific changes. Placental insufficiency is a syndrome based on morphofunctional changes in the placenta, which, when progressing, leads to delayed fetal growth and the development of hypoxia. Therefore, improving the diagnosis of various forms of placental insufficiency during pregnancy is one of the important issues in modern morphology. Immunohistochemical (IHC) analysis is a crucial diagnostic and research method in modern medicine and biology.

Studies aimed at assessing the expression levels of immunohistochemical markers such as Ki-67 and Bcl-2 as well as the comparative analysis of morphometric indicators of tissue structures in histological forms of placental tissue in secondary placental insufficiency, hold significant scientific and practical importance.

Keywords: Secondary placental insufficiency, placental villi, uterus, Immunohistochemical markers, morphology, morphometry.

Introduction

Secondary placental insufficiency is caused by exogenous influences on placental formation in the 2nd half of pregnancy, leading to acute and chronic manifestations. The acute type is manifested by premature placental abruption, retroplacental hemorrhage, intervillous hemorrhage, decidual tissue hemorrhage, villous stroma hemorrhage, thrombi, infarction, pleural effusion, villous angiomatosis. The chronic type is complicated by fetal growth retardation, chronic hypoxia, and intrauterine death. Compensatory changes in the placenta are mixed: resorption, increase in terminal suckers, enrichment with capillaries, syncytiotrophoblasts, involutional-dystrophic changes: increase in fibrinoid content, narrowing of the inter-suckling space, fibrosis of the suckers, sclerosis of the vessels, calcinosis, inflammatory changes, sometimes, circulatory changes: infarction, thrombosis, hyperemia, decreased vascularization, obliteration of vessels, vascular hyperplasia; placental maturation lag: manifested by acceleration, deceleration, hypoplasia [5].

The purpose of the study is to study and analyze the morphological features of the placental tissue of secondary placental insufficiency using immunohistochemical markers.

Materials and methods: A total of 55 prepared paraffin blocks were selected from women with secondary placental insufficiency of different age groups for immunohistochemical staining. Tissue sections obtained for immunohistochemical staining were cut into 2-4 μm thick sections using a microtome, placed on a slide and covered with a poly-L-lysine coverslip. The obtained tissues were dehydrated and deparaffinized using the avidin-biotin immunoperoxidase method,

after deparaffinization, dehydration, and demasking, they were stained with antibodies in a special automated system Ventana Benchmark XT, Roche, Switzerland. The study was performed using Ki-67 and Bcl2, VEGFR antibodies, and the obtained microimages were analyzed using software (QuPath-0.4.0, NanoZoomer Digital Pathology Image) to identify positively expressed cells with a very high index.

Results and conclusions

Ki-67 is a marker of cell proliferation (growth and division), and its high expression indicates accelerated cell activity and regeneration processes in tissues. In case of secondary placental insufficiency, high levels of Ki-67 marker in trophoblast cells are observed.

In conditions of hypoxia and impaired blood circulation in the placenta, trophoblasts undergo high proliferation. These cells activate adaptive mechanisms to preserve the fetus and provide it with oxygen and nutrients.

Response to hypoxia

Due to hypoxia, the production activity of cells in trophoblasts increases. High Ki-67 indicates rapid proliferation of trophoblast cells in response to hypoxia and activation of compensatory mechanisms in the tissues.

Intensification of pathological processes

In conditions of secondary placental insufficiency, high levels of Ki-67 also indicate increased pathogenesis. In this case, increased proliferation due to limited resources of trophoblast cells may not fully ensure normal placental function.

Risk of decompensation

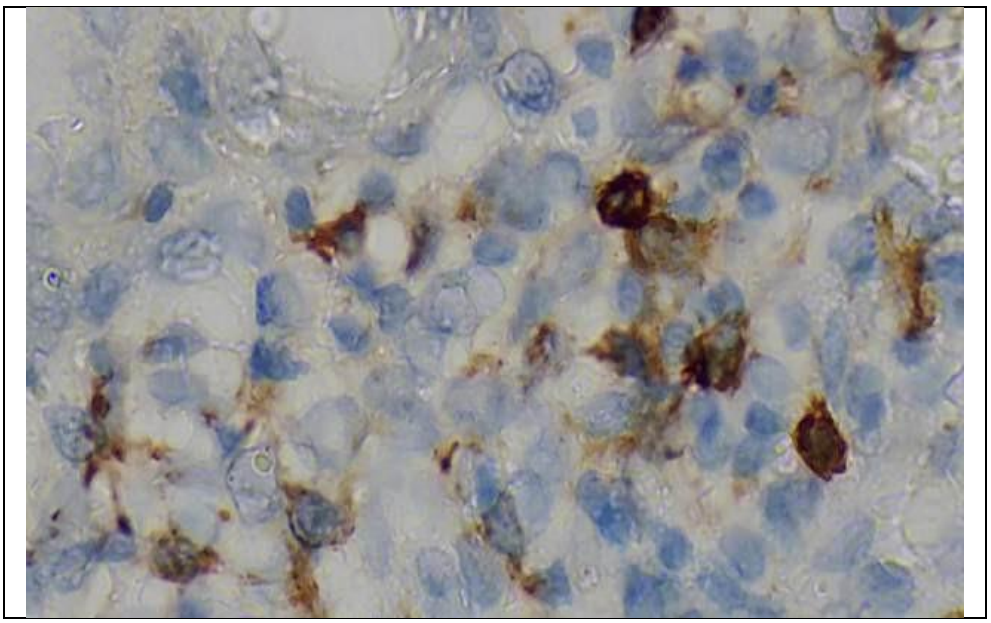
With a high level of Ki-67, the cells may be functionally impaired. In this case, the high proliferation mechanism cannot provide sufficient support for fetal development, and the risk of decompensation increases in the future.

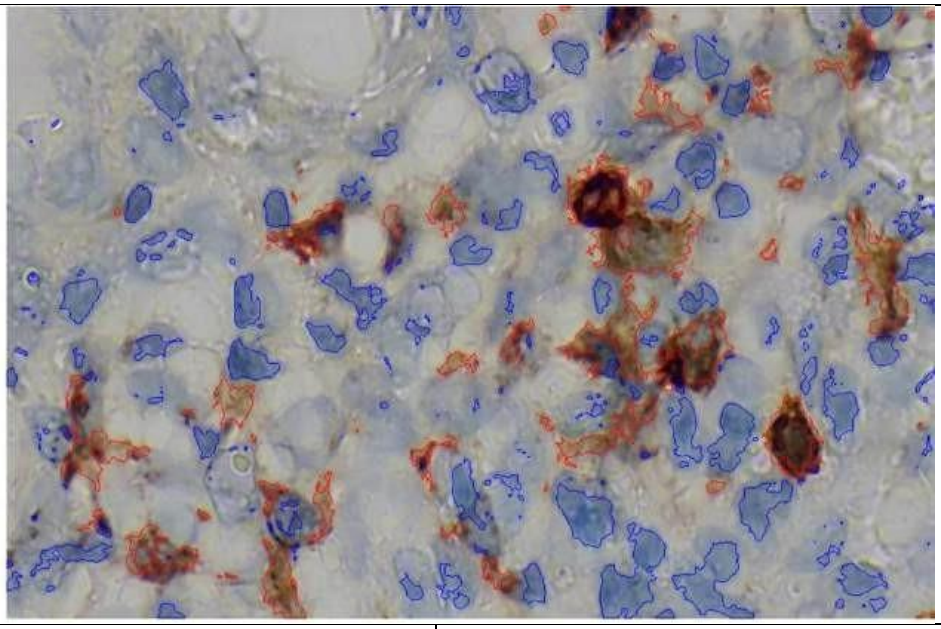
Immunohistochemical analysis of the proliferation marker Ki-67 in placental trophoblasts in secondary placental insufficiency revealed the following:

1. In 67% of images, Ki-67 expression in trophoblasts was high, with an average of 41.6-50.5%.

2. In 23% of images, Ki-67 expression was above average, with an average of 37.9-40.6%.

3. In 10% of images, Ki-67 expression was relatively low, with an average of 23.5-27.6%.





Total number of cells detected	360
Positive cells	150
Negative cells	210
Positive expression	41,6%
Total area	936250 px^2

Figure 1. Microscopic view of placental tissue in secondary placental insufficiency. Stained by the Dab. chromogenic method. Image magnified 200 times. Scanned and expressed using QuPath-0.4.0.ink. software. Expressed cells are in red. (%)

Bcl-2 (B-cell lymphoma 2) is a protein that plays an important role in controlling the process of apoptosis (programmed cell death) in cells. It belongs to the Bcl-2 family, which consists of antiapoptotic and proapoptotic proteins. Bcl-2 is an antiapoptotic protein that promotes cell survival.

Bcl-2 properties and functions:

1. Antiapoptotic function: Bcl-2 inhibits the activation of caspases (enzymes that initiate apoptosis); It stabilizes the mitochondrial membrane and prevents the release of cytochrome C.

This ensures the survival of cells in various stress or injury situations.

2. Localization: Bcl-2 is abundant in various tissues, especially in cells prone to apoptosis. The protein is located in the mitochondrial membrane, endoplasmic reticulum and nuclear membrane.

3. Relationship with pathologies:

Pathological expression of Bcl-2 can lead to the development of the following diseases: Increased expression - a process of evading apoptosis in cancer cells.

Reduced expression - is associated with increased apoptosis in diseases such as ischemic injuries or placental insufficiency.

Diagnostic significance:

Study of Bcl-2 levels is important in the evaluation of oncological diseases, autoimmune processes, neurological disorders and placental pathologies.

Decreased Bcl-2 in placental insufficiency indicates increased apoptosis, which negatively affects the transport and protective functions of the placenta.

Clinical significance, analysis of Bcl-2 expression in the placenta is used in the study of pregnancy complications such as placental insufficiency, hypoxia and preeclampsia.

Bcl-2 also plays an important role in assessing the dynamics of cells and developing treatment strategies in various pathological conditions.

CONCLUSION

According to the results of the general analysis, low-level expression of the Bcl-2 marker (in 62% of cases) indicates high activity of apoptosis processes in tissues and is associated with pathological changes in placental tissues. Although slightly higher expression (23%) in some cases helps to ensure cell survival, it is not enough to improve the overall functional state. Only in 15% of cases, Bcl-2 is preserved at a more normal level, which provides the opportunity to maintain the apoptosis process in tissues at a relatively stable level.

Using the Ki-67 marker, it is possible to determine and assess the degree of placental insufficiency. High proliferation in trophoblasts (increased Ki-67 expression) reflects increased hypoxia and compensatory reactions in placental tissues. Low expression of the marker indicates decreased cell activity.

The Ki-67 proliferation marker is important in determining the morphological and functional degree of placental insufficiency and helps in early diagnosis of this pathology and development of targeted treatment strategies.

These changes indicate pathological processes in the placental blood vessels and functional insufficiency of the tissue.

List of references

1. Автандилов Г.Г. Медицинская морфометрия.-М. 1990; 149с.
2. Абдуразакова М. Д. Бабаджанова Г. С. Особенности состояния фетоплацентарного комплекса у беременных женщин при варикозной болезни вен нижних конечностей и органов малого таза //Новости дерматовенерологии и репродуктивного здоровья. - Ташкент, 2017. №3-4 (1). - С. 11-12.
3. Абдусамадова М. Ф. Каримов А. Х. Влияние некоторых факторов риска при беременности на развитие синдрома ограничения роста плода: материалы Республиканской конференции «Акушерские кровотечения: новые технологии профилактики и лечения» //Новости дерматовенерологии и репродуктивного здоровья. - Ташкент, 2016. №1-2. - С. 172
4. Маматкасимов А. М., Юлдашева Ш. Ф. Морфологические изменения плаценты при фетоплацентарной недостаточности у беременных женщин // Новости дерматовенерологии и репродуктивного здоровья. - Ташкент, 2014. - №3 - С. 6-8.
5. Нагайцева Е. А., Серова Н. С. Сравнительный анализ эхографических и морфологических изменений при плацентарной недостаточности // Ультразвуковая и функциональная диагностика. 2017. - №1. - С. 25-38.
6. Shomurodova Mukhayo Rakhmonovna, (May 6, 2023). Morphological Features and Morphometric Parameters of the Lungs after Correction with an Immunomodulator Under the Conditions of Experimental Chemotherapy. Journal of Natural and Medical Education (pp. 55-60).
7. Shomurodova Mukhayo Rakhmonovna, (05 2023) Mastopatiya. Yosh Patmorfolog Nigohida. Amaliy va tibbiyot fanlari ilmiy jurnali (193-197) https://sciencebox.uz
8. Shomurodova Muxayyo Raxmonovna (05 2023) Morfometricheskie Pokazateli Legkix Posle Korreksii Immunomodulyatorom V Usloviyax Eksperimentalnoy Ximioterapii Amaliy va tibbiyot fanlari ilmiy jurnali (198-202) https://sciencebox.uz
9. Shomurodova M. R. (2023). Morphological Changes in Lungs Caused by Chemotherapy in Breast Cancer. American Journal of Pediatric Medicine and Health Sciences (2993-2149), 1(10), 341–344. Retrieved from http://grnjournal.us/index.php/AJPMHS/article/view/2088