# Influence of Maternal Age on the Structure of Umbilical Cord Vessels: A Histomorphological Study

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## ABSTRACT

***Background:*** The structural variations in the umbilical cord linked to advanced pregnancy may have an impact on the fetus's viability.

***Aim of the study:*** The goal of this project is to revise the consequences of geriatric pregnancy on the structural tissue of the umbilical cord.

***Materials and Methods:*** From January 2022 to May 2022, samples were drawn at random from the obstetrics and gynaecology unit at Al-Khansaa Teaching Hospital in Mosul. Pregnant women aged 15 to 50 years were divided into two groups: those over 35 and those under 35 pregnant. Both groups underwent a comprehensive histological examination, morphological analysis, and histopathological umbilical artery research. These biopsies were prepared for light microscopy. The data was also subjected to statistical analysis.

***Results:*** Histomorphology of this study revealed no significant relationship between the pregnant woman's age and the length and diameter of cord, in addition there was a reduction in Wharton's jelly with advanced age compared to young age. Also, the current study revealed significant variations in the width of the tunica intima and tunica media layers and the wall-lumen ratio of umbilical vessels related to different ages. Microscopic measurements of geriatric pregnancy showed a decline in Wharton jelly fibers and the formation of a devoid cavity resembling a comb of honey. The endothelium of birth cord vessels corroded, causing their muscle cell to separate. The amount of collagen fibre concentration in the wall of the cord vessels decreased and there was degradation.

***Conclusion:*** Women over 35 are regarded as pregnant women at risk due to changes in the gross anatomical parameters and microscopic morphology of their cords, which are reflected in the well-being of their offspring.

***Keywords:*** Umbilical vessels, Geriatric pregnancy, Wharton's jelly.

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# تأثير عمر الأم على بنية أوعية الحبل السري: دراسة نسيجية

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## الخلاصة

**الخلفية:** قد يكون للاختلافات الهيكلية في الحبل السري المرتبط بالحمل المتقدم تأثير على بقاء الجنين.

**الهدف:** هذا المشروع هو مراجعة عواقب الحمل المسنين على الأنسجة الهيكلية للحبل السري .

**المرضى والطرق:** من كانون الثاني/يناير ٢٠٢٢ إلى أيار/مايو ٢٠٢٢، تم سحب عينات عشوائيا من وحدة أمراض النساء والتوليد في مستشفى الخنساء التعليمي في الموصل. تم تقسيم النساء الحوامل اللائي تتراوح أعمارهن بين ١٥ و ٥٠ عاما إلى مجموعتين: أولئك الذين تزيد أعمارهم عن ٣٥ عاما وأولئك الذين تقل أعمارهم عن ٣٥ عاما حوامل. خضعت كلتا المجموعتين لفحص نسيجي شامل وتحليل مورفولوجي وأبحاث الشريان السري النسيجي المرضي. تم إعداد هذه الخزعات للفحص المجهري الضوئي. كما خضعت البيانات للتحليل الإحصائي.

**النتائج:** كشف علم الأشكال النسيجية لهذه الدراسة عن عدم وجود علاقة ذات دلالة إحصائية بين عمر المرأة الحامل وطول الحبل وقطره ، بالإضافة إلى وجود انخفاض في هلام وارتون مع تقدم العمر مقارنة بالعمر الصغير. أيضا، كشفت الدراسة الحالية عن اختلافات كبيرة في عرض طبقات الغلالة الداخلية والغلالة الوسطى ونسبة الجدار إلى تجويف الأوعية السرية المتعلقة بالأعمار المختلفة. أظهرت القياسات المجهرية لحمل المسنين انخفاضا في ألياف وارتون الهلامية وتشكيل تجويف خال يشبه مشط العسل.

تآكلت بطانة أوعية الحبل السري عند الولادة، مما تسبب في انفصال خلاياها العضلية. انخفضت كمية تركيز ألياف الكولاجين في جدار أوعية الحبل السري وكان هناك تدهور.

**الخلاصة :** تعتبر النساء فوق سن ٣٥ عاما نساء حوامل معرضات للخطر بسبب التغيرات في المعلمات التشريحية الإجمالية والتشكل المجهري لأحبالهن ، والتي تنعكس في رفاهية ذريتهن.

**الكلمات المفتاحية :** الأوعية السرية ، حمل الشيخوخة ، هلام وارتون .

## INTRODUCTION

A pregnancy of women whose age is greater than 35 years at time of labour is mentioned as geriatric pregnancy. The average age of a woman giving birth in North America has increased dramatically; today, fourteen to eighteen percent of all births are to women over the age of Thirty-five[1]. Research has indicated that older mothers are more likely to have pregnancy-related problems like intrauterine retardation baby, high blood pressure, gestational diabetes and others[2]. However, it is unknown what disorder mechanisms lead to an increase in that probability[3]. As a result, geriatric pregnancy is regarded as a health risk that leads to bad obstetric consequences[4]. These results demonstrate that older mothers have become a source of health concern around the world, and they constitute a large segment of society despite the lack of research that has addressed this topic[5]. Normal fetal growth and development depend critically on the mother's healthy vascular adaptations to pregnancy[6]. These natural adaptations resulting from pregnancy are subject to serious anatomical, structural and physiological changes in ageing women, which may affect the outcome of pregnancy and alter vascular function[7]. The vascular endothelium is a tissue that adapts during the environment of a healthy pregnancy, but it can also become dysfunctional with age, as well as endothelium-dependent vasodilation in healthy subjects decreases steadily with increasing age[8]. The senescent vervet monkey model showed poor adaptation to pregnancy, including internal secretion, immune and vascular disturbance, as well as postnatal growth restriction[9].

The fetus receives blood from the mother that is rich in nutrients and oxygen through a single umbilical vein [10]. Two arterial vessels, transport sewage like carbonic acid gas from the embryo return to the placenta along with oxygenated blood[11]. The normal umbilical cord is 50 to 60 cm long at term, with a monolayer of amniotic epithelial cells covering its surface[12]. The ground substance that constitutes within umbilical cord is named Wharton's gelatinous jelly[13]. The arteries' spiral path around the vein determines the birth cord's distinct structure[14]. The arrangement of smooth muscle fibres and elastic fibres found in the birth cord vessel wall promotes rapid constriction[15]. While the outer layer is circular, the inner layer is arranged loosely and irregularly[16]. The present research is intended to observe the influence of age on immune-histo-morphometry structural changes of the birth cord with its vessels in term pregnancies.

## MATERIALS AND METHODS

Study design: This is a case-control study that is both prospective and observational.

Study setting: the samples were drawn at random from the obstetrics and gynaecology unit at Al-Khansaa Teaching Hospital in Mosul from January 2022 to May 2022. Patients were divided into two groups: those over 35 and those under 35 years old.

The following criteria were met for inclusion: prenatal checkups were attended by pregnant mothers between the ages of 15 and 50. Patients with no medical history of diabetes or hypertension, and those with a gestational age above 35weeks. Women who are excluded, under the age of 15 and over the age of 50 in addition to pregnant suffer from medical or surgical disorders.

### Techniques of the Study

a. Case history and clinical examination

b. After obtaining the specimen macro-examination of the umbilical cord length and diameters were measured in centimeters. A calculation was conducted on the total coil count in the cord using the following equation[17]. A coil was defined as the umbilical vessels' complete a three hundred and sixty degrees spiral path.

$$\textit{Umbilical Coiling Index} = \frac{\text{Total Number of Complete Vascular Coiling}}{\text{Total Length of Cord (cm)}}$$

c. Micro-structural analysis of the specimen

d. Statistical Evaluation

Umbilical cord preparation for histology slide: Three locations, one at the foetal end (i.e., 2 cm from the cut end after clamping), one at the maternal end (4 cm from the placental attachment), and one in the middle of the cord, were used to extract a 1 cm length of cord for histological and immunohistochemical analysis[18].

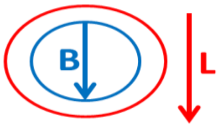
Histological preparations and stains: The tissues were preserved in 10% formalin. Encased in paraffin wax and prepared in paraffin blocks. Tissue serial sections were taken. The slides were dewaxed with xylene and hydrated using a graduated alcohol-to-water ratio, and prepared for staining. Hematoxylin-eosin stain was used for standard micro-anatomical analysis and Masson's trichrome stain to detect collagen fibers.

Microscopic examination of the umbilical cord: The stained slides were examined under a binocular light microscope under different magnifications(Olympus- CX31). Micrograph sections were taken using a colour USB digital camera presented with computer graphics software. The software of the microscopic camera was standardized with the help of an ESM-11 0.01mm stages micrometres (Japan ) at, X100, X200, and X400 magnifications

Measurement of Wharton's jelly area in A millimeter: To measure the Wharton's jelly area, the following equation was used:

Wharton's jelly area = cord area - vessel area

The area of both cord vessel were measured as indicated in figure 1 with associated equations[19-21]:




$$D = \frac{L+B}{2} \qquad r = \frac{D}{2} \qquad A = r^2$$

Figure 1. Diagram describing the measurement of Wharton's jelly area in A millimeter

D= diameter of the cord or vessel

L= largest diameter of the cord or vessel

B= smallest diameter of the cord or vessel

r= radius of the cord or vessel

A=area of the cord or vessels

The wall-lumen ratio was calculated by dividing the thickness of the wall by the lumen. The thickness of individual vessel layers, intima and media, as well as vessel endothelium thickness, were all measured using an ocular millimeter. The percentage of intima and media was calculated from the total thickness. The endothelium was examined under high magnification. The lumen area parameters were dignified by means of the color USB 2.0 digital image camera "Scope Image 9.0- China" that providing with image dispensation software. The software of the microscopic camera was standardized with the help of an ESM-11 0.01mm stages micrometres (Japan ) at, X100, X200, and X400 magnifications

Statistical studies: The information was entered into SPSS ver. 10 , a computer program. Using the student's paired t-test. The degree of significance between the two groups was determined. The data was displayed as mean±SD. It was deemed statistically significant when a P<0.05.

## RESULTS

The light microscopic result: the umbilical cord of women group aged under 35 treated with Hematoxylin and Eosin presented that they contain double arteries and a single vein implanted in a gelatinous mucoid connective soft tissue matrix named Wharton jell and are surrounded by amnion formed of one layer of cubical or low columnar epithelium. Wharton jell is constituted of basic stain myofibroblast cells with large centrally located nuclei with mucous matrix. The umbilical cord artery appeared with an interstellar-shaped lumen, with one sheet of flattened endothelium making up the tunica intima, which is surrounded by a connective tissue basal lamina, with elastic fibres with an absence of membrane that separates tunica media and intima. Tunica media have dense haphazardly organized smooth muscle fibers which are fusiform shaped and have oval nuclei with eosin stains cytoplasm. Between smooth muscle fiber, connective fibrous tissue elements are embedded as; elastic, collagen with an extracellular matrix presented between them. The tunica externa of arteries were substituted by dense mucous connective fibrous tissue. The umbilical cord vein can be distinguished by having a large, thin-walled lumen and a thicker layer, tunica externa, which contains a concentration of mucosal connective tissue (Figure 1).

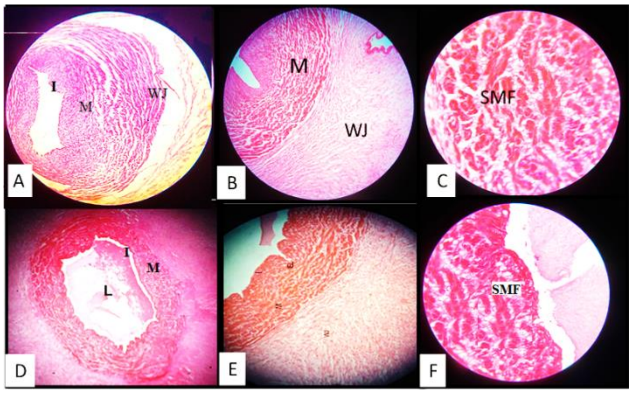



Figure 1. A representative image for the UC section of pregnant women age less than 35 years. (A) a section of the umbilical artery showing the intima (I)and thick media (M) with no adventitia, surrounded by Wharton's jelly (WJ). (B) Wharton's jelly. (C) presence of (SMF). (D) Umbilical vein with wide lumen (L), thin intima (I), and thin media (M). (E) Thick adventitia (F) Longitudinal bundle of SMF. H & E X 200, 100, 100, 400, 400 and 400 respectively.

Examination of histological H&E slides of the umbilical cord of a woman aged over 35 years showed Wharton's jelly in a disordered form in which connective tissue fibres are widely separated by wide, honeycomb-like hollow spaces beside shrinkage and incoherently arranged collagen tissue fibres. Microscopic image of the umbilical artery which represented narrow lumen compared to the group below 35 years. Further to the discontinuity of endothelium in the inner layer with some loss of surface epithelium. Tunica media appears marked by diffuse smooth muscle fibre interrupted by connective tissue with a limited amount of collagen, and elastic tissue. The veins wall of the cord appeared thin and deformed with a wide cavity compared to the other group. There was also no tunica externa. There was endothelium disintegration and abrasion in the tunica intima of the vein. More distance separates the smooth muscle fibres due to the haphazard arrangement of connective fibrous tissue in media (Figure 2,3).

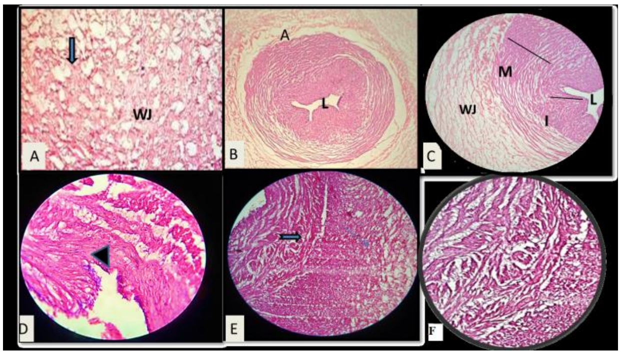



Figure 2. A representative image of geriatric pregnant women's umbilical cords displaying: the honeycombs (↓) in (A) Wharton's jelly (WJ). An area of an umbilical artery with a narrow lumen (L) is shown in (B); an area of the umbilical artery with intima (I) and thick media containing cell debris is illustrated in (C); an area of the umbilical arterial with focused endothelial covering erosion is shown in (D); (E) An uneven SMF in set configuration (⟵) (F) Displaying the umbilical artery wall with open gaps among muscle cells are indicative of swelling, H & E X 200, 100, 100, 400, 400 and 400 respectively

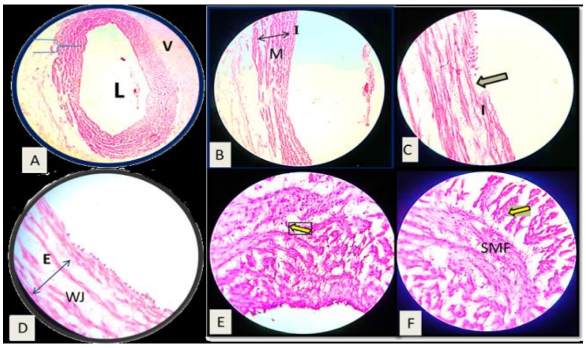



Figure 3. Representative images of umbilical cord sections of geriatric pregnancy showing: (A) the wall of umbilical vein (V) with a thinner wall and wider lumen (L), (B) showing part of umbilical Vein (V) with thick media(M), intima(I) (C) focal erosion of endothelial lining (⟵) (D) thick tunica externa (E) notice honeycombs (F) irregular arrangement of SMF (↓)H & E X 200, 100, 100, 400, 400 and 400 respectively

A microscopic examination of the birth cord from the mother below 35 years stained using Masson's trichrome dye revealed that Wharton's jelly-incorporates fibres of collagen. When compared with a wall of veins, the arterial wall had more collagen fibres in tunica intima as well as between smooth muscle fibres of the middle layer. Geriatric pregnancy umbilical cord segments treated with Mallory dye revealed fewer collagen strands spaced widely apart. The collagen strands in the tunica intima and between smooth muscle fibers of the media in the veins and arteries were disrupted and degenerating, and the organization in the middle and inner layers was disoriented (Figure 4).

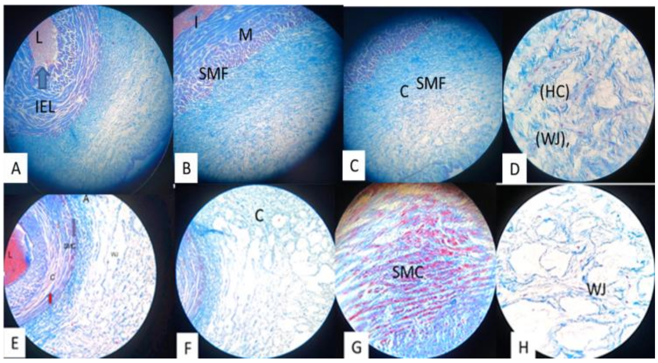



Figure 4. Upper panel is umbilical vessels in an elderly pregnant woman (A) wall of umbilical vein lumen (L) The umbilical vein showed internal elastic lamina(IEL) that not continuous through tunica intima. (B) The intima and media are thin more than in arteries. The smooth muscles fiber SMF in media are arranged in irregularly branched laminae. (C) Smooth muscle fiber which are separated by connective tissue with few collagen fibers (c). (D) honey combs (HC) with Wharton's jelly (WJ)

Lower panel is umbilical artery (E) Wall umbilical artery with a narrow lumen (L). (F) show a marked decrease in collagen fibres C in the media of arterial wall (G) collagen fibres running haphazard between the SMC in the media. Collagen fibres (blue), (H) decrease concentration of Wharton's jelly (WJ), honeycombs Masson's trichrome X 100- 200- 100. and 200-400).

Cross anatomy measure: Concerning table 1, there wasn't any discernible relationship between the mean length diameter and coiled index of the birth cord between the 2 groups

Table 1. Anatomical analysis of birth cord

| Parameters | Pregnancy (<35 years) | Pregnancy (>35years) |
|---|---|---|
| Mean cord length ± SD (cm) | 63.84±5.69 | 65.25±8. 43 |
| Mean cord diameter ± SD (cm) | 1.19±0.18 | 1.39±0.38 |
| Index of umbilical cord | 0.23±0.09 | 0.24±0.27 |

The morphometric measure: Table 2 demonstrates the microscopic characterization of the umbilical cord. It has been seen a restriction of Wharton's jelly in mothers over 35 years old, in the three sites of the cord.

Table 2. Micro-structural study of birth cord

| Parameters ($mm^2$) | Pregnancy (<35 years) | Pregnancy (>35years) |
|---|---|---|
| Wharton's jelly area embryonic end | 34153.41±8 412.13 | 281446.38±41 26. 54* |
| Area- Wharton's jelly (mid region ) | 31734.84±9 74.74 | 21843.58±973 .34* |
| Area- Wharton's jelly(maternal end) | 45342.76±8 54.21 | 36344.46±846 .53* |
| t-test comparison between groups. There is statistically significant when *p < 0.05. | | |

Image analysis showed a measurement of the percentage of collagen in the wall of the umbilical vein and artery A statistical significance reduction in the percentage of collagen concentration in mothers over 35 years of age (Table 3).

Table 3. The collagen concentration in the venous, and arterial cord wall according to age as a percentage.

| Parameters | Pregnancy (<35 years) | Pregnancy (>35years) |
|---|---|---|
| % of the artery's collagen area | 46.52±5.293 | 24.14±6.735* |
| % of the vein's collagen area | 26.72±6.351 | 11.32±2.128* |
| t-test comparison between groups. There is statistically significant when *p < 0.05. | | |

Regardless histomorphometric of the artery, the inner intima and middle media increase with the advancing age of the pregnant woman, so the percentage of wall-lumen in pregnant females over 35 years of age decreases. These differences were detected in three regions of the cord segments, especially in the embryonic end segments as shown in Table 4.

Table 4. Microstructural analysis of the umbilical artery

| Parameters | Pregnancy (<35 years) | Pregnancy (>35years) |
|---|---|---|
| Microstructure of umbilical artery in embryonic end | | |
| wall-Lumen ratio | 20.63±3.57* | 13.23±1.13 |
| The total thickness of the wall in (mm) | 4. 38±0.53 | 5. 04±0.23* |
| thickness of Intima(mm) | 1. 13±0. 47 | 1. 53±0.13* |
| thickness of Media (mm) | 2.84±0.34 | 3. 0 3±0.54 |
| Microstructure of umbilical artery in the middle of cord | | |
| wall-lumen ratio | 8.73±0.25 | 7.52±0.74* |
| The total thickness of the wall in (mm) | 3.63±0.43 | 4.23±0.83* |
| thickness of Intima (mm) | 1.16±0. 24 | 1.35±0.58* |
| thickness of Media(mm) | 2.52±0.73 | 2.92±0.43* |
| Microstructure of umbilical artery in maternal end | | |
| wall-lumen ratio | 10.76±0.57 | 9. 21±0.27* |
| The total thickness of the wall in(mm) | 3.15±0.63 | 3.68±0.84* |
| thickness of Intima (mm) | 1.17±0.58 | 1.57±0.23* |
| thickness of Media (mm) | 2.59±0.57 | 2.90±0.57* |
| t-test comparison between groups. There is statistically significant when *p < 0.05. | | |

The thickness of the inner intima and middle layer (media), and the lumen/ratio in the venous wall, were non-significantly higher in those over the age of 35 years. As shown in Table 5.

Table 5. Umbilical vein microstructural analysis

| Parameters | Pregnancy (<35 years) | Pregnancy (>35years) |
|---|---|---|
| Microstructure of umbilical vein in embryonic end | | |
| wall-Lumen ratio | 3.31±0.28 | 4.8±21 |
| The total thickness of the wall in(mm) | 2.65±0.74 | 2.1 5±0.23 |
| thickness of Intima (mm) | 0.10±0.19 | 0.38±0.16* |
| thickness of Media (mm) | 1.43±0.67 | 1.8 5±0.43 |
| Microstructure of umbilical vein in the middle of cord | | |
| wall-lumen ratio | 2.19±0.24 | 2.91±0.24 |
| The total thickness of the wall in(mm) | 2.57±0.34 | 2.03±0.52 |
| thickness of Intima (mm) | 0.19±0.74 | 0.24±0.43* |
| thickness of Media (mm) | 1.88±0.36 | 1.95±0.43 |
| Microstructure of umbilical vein in maternal end | | |
| wall-lumen ratio | 2. 14±0.53 | 2. 97±0.14 |
| The total thickness of the wall in(mm) | 2.23±0.58 | 1.94±0.58 |
| thickness of Intima (mm) | 0.24±0.10 | 0.39±0.11 |
| thickness of Media (mm) | 1.45±0.57 | 1.98±0.48 |
| t-test compares between groups. There is statistically significant when *p<0.05. | | |

## DISCUSSION

In this study, the umbilical cord parameter was examined under a microscope, and the results revealed that there was no discernible change in the umbilical cord's length, diameter, or coiling index as it aged. The current study's findings were also generally accepted[22], According to Tahmasebi et al. [23], there is no significant relationship between the pregnant woman's age and the length, diameter, and coiling of the birth cord. Similar to a previous histomorphometric study on the umbilical cord by Damasceno et al [24], there was a reduction in Wharton's jelly with advanced age compared to young age [25]. Alrefae et al in their immunoexpression study discovered a significant negative correlation between Wharton's jelly (WJ) and maternal age (p 0.001).[26] Furthermore the collagen fibers in Wharton's jelly were disrupted and degenerated in older pregnant samples in the current investigation. These fibres became extensively disconnected by large, random, hollow spaces that resembled honey colonies, and their quantity drastically decreased. This deterioration and emptied holes occur due to decreased cord blood stream as a result of narrowing of the lumen changes in the adaptation of the artery, and the pathological events resulting from this histological change with advanced maternal age. Furthermore, Gupta et al, found a reduction of specialized stem differentiation cells, which are normally controlled by the glycosaminoglycan hyaluronate found in connective tissue as a result of the jelly degeneration in old age pregnant women [27]. This result is consistent with that of Gil-Kulik et al. [28], who used human umbilical cord samples to observe the structural effects of ageing on the cord-containing tissue. They are confident that the distribution and pattern of the Wharton's jelly fibres had changed, and there were honeycomb-like voids in between them. Elabd et al., [29] proved that increasing maternal age induces changes in the ultra-structural of newborn umbilical cords. These alterations include reductions in collagen fibre, vessel wall pattern, and defects in the matrix outside of a cell.

In the current revision, it was observed that the birth cord vessels' tunica media and tunica intima layers were both thicker. According to Lee and Park[30], who also demonstrated that vascular complications are associated with advanced age, they concurred with the current research in that they are often associated with lumen narrowing and wall thickening. Although their analysis focused on peripheral blood vessels rather than birth cord arteries. A possible explanation for the increased wall thickness in the umbilical artery observed in elderly woman samples could be neointimal hyperplasia, which is a physiological response to repeated strain and has been documented as a normal physiological enlargement of the intima and the media and may be the cause of the increased intimal thickness observed in advance maternal age samples[31]. The cells' migration of smooth muscle fibre toward the lining and the division of the inner elastic lamina as a result of prolonged stress exposure also contributed to the thickness of the inner layer [32]. Comparable outcomes were documented by Zain et al[33] who Noticed that the walls of the vessels in the umbilical arteries had thickened, although this was not completely true in the umbilical veins. Significant increases in wall area with lower lumen-to-wall ratio, suggest that vascular changes must be taken into account because they have serious effects on pregnancy outcomes and involve a wide range of pregnant women within groups of women at high risk[34]. This work has some resemblance to that of Pande et al., who discovered notable variations in the histomorphology of umbilical arteries due to ageing-related alterations in the luminal diameter internal intima layer, and exterior layer at the same time that veins had a larger wall-lumen proportion[35]. It is challenging, based on our expertise, to provide a comprehensive clarification for the above results. Nonetheless, some information needs to be considered. For example, fluctuations in the production of hormonal substances, tissue susceptibleness to the above hormones, and modifications in the metabolic rate can influence the growth of organs and cause disruptions in microanatomical, psychological issues, and metabolic processes, this reflects limited responses in geriatric pregnancy[36].

Additionally, these blood vessels have a high degree of responsiveness to a variety of endocrine intermediaries, such as angiotensin, or serotonin which are generated by adjacent endothelium cells, additional compounds, that influence the smooth muscle cells within paracrine cycles, Therefore, any defect in endothelial cells due to ageing can change the complex processes mentioned previously[37]. Interestingly, the umbilical cord vessels become more responsive to mechanical irritation during the last two weeks of pregnancy, and this helps explain some of the changes observed in the wall and luminal areas[34]. Changes in endothelial physiology in the umbilical veins will hurt umbilical vein reactivity. As a result, blood flow from the womb's placenta to the developing baby may be restricted, causing major complications for the developing fetus[38]. The current investigation revealed discontinuation and endothelium destruction in the arteries of the elderly attributed to elevated oxidative/nitrative stress. This consequence is in line with studies by Ungvari et al

[39]. who found that endothelial cells subjected to oxidative stress exhibit enduring arterial structural alterations. Pregnancy in geriatric pregnancy is linked to a reduction in endothelium-dependent vascular relaxation, with a lower nitric oxide contribution, according to Pasha[40]. An elevated rate of endothelial apoptosis has been linked to vascular endothelial dysfunction and may reduce the quantity of healthy vascular endothelial cells with ageing, as approved by Wen et al[41].

Oakley and Tharakan[42], who emphasized the mechanisms that lead to endothelial structural alterations and their relationship to hyperpermeability, also emphasized how malfunctioning of the barriers with vascular hyper-permeability are caused by ageing-related physiological, cell-based, and genetic changes in the system of arteries and veins. Aging endothelium or called endothelial cellular senescence. Cells are in a state known as replicative senescence because a cell's ability to procreate is limited[43]. While proliferative senescent cells can sustain an active metabolism for periods then endothelial dysfunction may be exacerbated[44]. Furthermore, the development of the endothelium as a significant source of oxygen radicals explains oxidative damage. Tian et al,[45] proposed that because the vascular endothelium is unable to properly resist the stresses of physiological ageing, arteries undergo lumen contraction even in the absence of changes in the flow of blood velocity. Sections of older age samples stained with special stain trichrome in the current study revealed disruption and a decrease in collagen fibre quantity, with a disorder of their typical configuration in intimate and loss of smooth muscle cell fibre orientation in the media of the umbilical vessel's. This consequence was in line with the outcomes of Kohn et al.[46], who reported that variations in the distribution patterns of collagen fibres led to alterations in the elastin-to-collagen ratio, which regulates the mechanics of healthy arteries with ageing brings about. Furthermore, vascular alterations are a side effect of ageing that arise from exposure to biochemical alterations[47].

## CONCLUSION

Women over 35 are regarded as pregnant women at risk due to changes in the gross anatomical parameters and microscopic morphology of their cords, which are reflected in the well-being of their offspring.

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## Conflict of Interest

The author declares no conflict of interest

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