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Pregnancy in advanced age of mothers and fathers

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Abstract

There is a higher incidence of infertility, chromosomal aberrations, poor results of in vitro fertilization, ectopic pregnancies, spontaneous abortion, preeclampsia, placenta previa, gestational diabetes mellitus, caesarean section, chronic diseases with higher rates of admission into intensive care units, and a higher rate of maternal mortality among women who delay pregnancy into advanced age. This is mainly due to socioeconomic causes as well as the increased use of contraceptives. Problems due to advanced maternal age arise also with egg donations. Only chromosome aberrations are related to the age of the donor. Paternal age also appears to play a significant role in the outcome of the pregnancy. However, opinions vary in the literature available. Counseling the couples should be addressed.

Keywords: pregnancy, advanced maternal age, advanced paternal age

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Беременность в пожилом возрасте матерей и отцов

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Резюме

Среди женщин, отложивших беременность до более старшего возраста, наблюдается более высокая частота бесплодия, хромосомных аберраций, неудач экстракорпорального оплодотворения, внематочной беременности, самопроизвольных аборт, преэклампсии, предлежания плаценты, гестационного сахарного диабета, операций кесарева сечения, хронических заболеваний с более высокой частотой госпитализации в отделения интенсивной терапии и более высокой частотой материнской смертности. В основном это связано с социально-экономическими причинами, а также с ростом использования противозачаточных средств. Проблемы из-за преклонного возраста матери возникают и с донорством яйцеклеток: с возрастом донора связаны хромосомные аберрации. Возраст отца также играет важную роль в исходе беременности. Впрочем, имеющиеся в доступной литературе мнения различаются. Следует рекомендовать консультирование семейных пар.

Ключевые слова: беременность, пожилой возраст матери, пожилой возраст отца

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Highlights

What is already known about this subject?

- Mothers over 35 have more genetic risks.

What are the new findings?

- In older mothers we have fertility problems, problems with chronic diseases and the age of the father influence the morbidity of the child.

How might it impact on clinical practice in the foreseeable future?

- Don't give them an advise to prolong the pregnancy to elder age.

Основные моменты

Что уже известно об этой теме?

- У женщин в возрасте старше 35 лет увеличены генетические риски.

Что нового дает статья?

- У старородящей матери на заболеваемость ребенка влияют проблемы с фертильностью и имеющиеся хронические заболевания, а также возраст отца.

Как это может повлиять на клиническую практику в обозримом будущем?

- Не следует рекомендовать откладывать беременность до старшего возраста.

Introduction / Введение

What age is seen as advanced for reproduction? There is no clearly defined cut-off point for this state. Are mothers from the age of 35, or nowadays even from the age of 40 to be considered as older mothers? It has become quite natural to have pregnancies later on in life. However, there are several problems which occur in conception, pregnancy and birth. The question whether the age of the father is relevant for the outcome of the pregnancy is pertinent as well.

Epidemiology / Эпидемиология

In 1985, the average age of women giving birth in Austria was 24.0 years. In 2014, the average age had already risen to 26.3 years. In 2006, there were 2464 women who had their first child over the age of 40. Ten years later, this number had risen to 3409 mothers; an increase of almost 40 % [1]. The reasons for delaying pregnancy into later stages of life are first and foremost socioeconomic aspects, such as longer duration and higher intensity of education and training, making a career, but also the economic crisis (whether having a child would be too expensive), people remaining single for longer, higher divorce rates and increased access to contraception. The oldest woman to spontaneously fall pregnant was 57 years old [2].

Not only do blood vessels show arteriosclerotic changes in advanced age, there are also higher occurrences of chronic diseases of the heart, lungs, and kidneys, of metabolic diseases and rheumatism as well as cancer among women. Additionally, the component of the genetic material in advanced age groups becomes relevant.

On the other hand, older mothers or couples have an increased willingness to provide the best possible conditions for their children [3].

Sterility and fertility / Бесплодие и фертильность

In the age group of 20–24, infertility lies at 6 %, in the age group of 25–29 it is 9 %, in the age group of 30–34 it is 15 %, in the age group of 35–39 it is 30 % and from 40–44 years old it is 64 %. Drawing on methods of in vitro fertilization (IVF) in advanced age is also not as successful as for younger age groups. Below the age of 48, 4 % of the population had used artificial fertilization, above the age of 48, 78 % of women had turned to it. The success rates of artificial fertilization are 41.7 % in women younger than 35, and merely 4.1 % in women over 42. The success rates of IVF-procedures in women over 44 are only at 1 %, however, with egg donations rates climb to 51 %, regardless of the age of the recipient [4]. According to another study, the rate of live births after egg donations in women younger than 44 is 56 %, which decreases to 53 % in the age group of the 45–49, and to 49 % in women over 50 [5].

The higher rates of multifetal pregnancies due to artificial methods of fertilization are remarkable, which are 18 % in women over 48, as opposed to 2 % in women under 48 [6]. This is caused by a higher follicle stimulating hormone level in combination with the decreased ovarian reserve (anti-Müllerian hormone < 1.1 ng/mL).

Genetic problems / Генетические проблемы

All types of chromosomal anomalies have an incidence of 1:345 in the age group of 33-years-olds, while the incidence among 45-year-olds amounts to 1:19. Trisomy 21 had an incidence of 1:625 among 33-year-olds, among the 45-year-olds this was at 1:39 [7].

Among 20-year-old women, the NIP-Test (Non-Invasive Prenatal Testing) was positive at a rate of 48 % for Trisomy 21, 14 % for Trisomy 18 and 6 % for Trisomy 13. The corresponding rates for 30-year-olds were 61 %, 21 %, and 10 %, for 40-year-olds 93 %, 69 % and 50 %, for 45-year-olds 98 % for Trisomy 21 and 90 % for Trisomy 18. There is no data available for Trisomy 13 [8].

Complications during pregnancy / Осложнения беременности

The incidence of ectopic pregnancies lies at 2 % in those below 18 years of age, and rises continually to 7 % in the age group of 45 years and above [4].

The rate of spontaneous abortions lies at 13.3 % in the age group of 12–19-year-olds, for women over the age of 45 this rate lies at 93.4 %. The rate of stillbirths in these age groups lies at 0.5 % and 0.82 % respectively [4].

The risk of preeclampsia rises significantly with age. The overall rates lie at 3–4 %, while this rises to 5–10 % in the age group of 40 and above, at over 50 the rate is 25 % [9, 10].

The incidence of gestational diabetes mellitus increases from 3 % (all age groups) to 7–12 % in those over 40, and 20 % in those over 50 [9, 10].

The rate for placenta praevia is ten times higher in women over 40 (0.25 %) [11]. Placental abruption however does not occur more frequently in older women [12].

According to a study, the premature births rate (before the 32nd week) is 1.01 % in the age group of 20–29 years, and 1.80 % in the age group of 40–44, and rises to 2.24 % among those over 45.

Fetal growth restriction rates below the 5th percentile lie at 5.6 % in women younger than 45, and at 11.0 % in women over 45 [13].

The incidence of chronic diseases naturally rises with age. The rate of non-pregnancy related chronic diseases in women over 48 years is 44 %, versus 28 % in women under 48. These are mostly pulmonary diseases, cardiac diseases, musculoskeletal diseases, rheumatism and cancer. Due to these health conditions, the necessity of

intensive care is 33 times higher than for women below 48 [14].

Complications during birth / Осложнения родов

Recent publications show that among 78.000 births in the USA, the rate of caesarean section was at 20 % in the age group of 25–34, which continually rises and was at 26 % for those between 35 and 39. In the age group of 40–44 the rate was 31 %, in the age group of 45–49 36 %, and 61 % in women over 50 [15].

Stillbirths were also more frequent with increasing age. The rate was at 3.73 % in those under 35, 6.41 % in those between 35 and 39, and 8.65 % in those over 49 [16].

The higher incidence of intensive care due to chronic diseases is accompanied by increased maternal mortality in older age groups. In the age group of 15–19, the rate of maternal mortality was 8,9 out of 100.000 births, in the age group of 35–39 it was 24,1 out of 100.000 births, and in those over 40 the incidence rose to 54,9 out of 100.000 births [17].

The influence of paternal age on the pregnancy outcome / Влияние возраста отца на исход беременности

Paternal age is rising as well. A British study showed that paternal age from 35–54 has risen from 25 to 40 % over a ten-year period [18].

Fertility in men also decreases with increasing age, as chronic diseases, stress, and the effects of smoking take hold, but also genetic changes such as DNA breaks occur. A British study found during a 12-month period that conception was more than 30 percent less likely for men over 40 than for men under 30 [19].

In theory, men are capable of procreation at any age. However, advanced age is associated with an increase in DNA alterations, as 1300 mitotic cell divisions have already taken place in a 70-year-old man. These frequent cell divisions certainly can lead to chromosomal abnormality [20, 21]. According to a French study, paternal age was the only factor responsible for the low rate of pregnancies after intrauterine insemination [22].

Opinions vary on whether older fathers are the cause of more frequent spontaneous abortions, fetal growth restriction, preterm deliveries, stillbirths or other complications in their partners [23–26].

There are indications that the cognitive development is poorer in the children of older fathers. An American study involving 33.000 children showed a marginal neurological deficit [27]. This is balanced by an observation in the same study that a better IQ was seen in children whose mothers were also older. On the other hand, a Swedish study involving 565.000 children found that a lesser IQ was observed in children with advanced maternal age [28].

There is a statistically insignificant correlation between increased paternal age and the risk for autistic disorders [29].

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