IQWiG Reports – Commission No. S16-06

Non-invasive prenatal testing (NIPT) to determine the risk of autosomal trisomies 13, 18 and 21 in high-risk pregnancies[1]

Extract

[1] Translation of the key statement of the final report S16-06 *Nicht invasive Pränataldiagnostik (NIPD) zur Bestimmung des Risikos autosomaler Trisomien 13, 18 und 21 bei Risikoschwangerschaften* (Version 1.0; Status: 30 April 2018). Please note: This document was translated by an external translator and is provided as a service by IQWiG to English-language readers. However, solely the German original text is absolutely authoritative and legally binding.

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This report was prepared in collaboration with external experts.

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Key statement

Research question

In accordance with further specification by the Federal Joint Committee (G-BA), the following research question is to be investigated in this report:

- "Assessment of the diagnostic characteristics of non-invasive prenatal testing (NIPD) for the detection of embryos and foetuses with trisomies 13, 18 and 21.
  - The experimental intervention is to be NIPD by means of a molecular genetic test for determining the risk of autosomal trisomies 13, 18 and 21.
  - The reference tests to be considered are cytogenetic diagnostics following invasive sample collection (amniocentesis, chorionic villus sampling, or cordocentesis) as well as postnatal clinical diagnosis.

The additional calculation of various scenarios (quantitative modelling) is to estimate how the potential use of NIPD in different groups (e.g., based on the risk determined by first-trimester screening) influences the results of testing in pregnant women in Germany overall (e.g., false positive rate of NIPD test, resulting development of the rate of invasive procedures)."

Conclusion

The sensitivity and specificity of NIPD for the detection of trisomy 21 are 99.13% (95% CI: [97.39 %; 99.72 %]) and 99.95 % (95 %-CI: [99.88 %; 99.98 %]). Since the calculations did not take into account the potential influence of test failure, the sensitivity or specificity of NIPD may have been overestimated. It was not possible to provide a robust estimate of the sensitivities and specificities for trisomies 13 and 18, but the sensitivities are likely lower.

These results are based on a total of 22 studies on diagnostic characteristics, of which 17 have a high risk of bias. However, with regard to the detection of trisomy 21, there is hardly a difference in results between the studies with a low risk of bias and those with a high risk of bias.

The scenarios on the use of NIPD for detecting trisomy 21 are calculated based on a strategy for calculating the risk in all pregnant women using the existing approach without NIPD, a first-line strategy and a second-line strategy. If the test were to be used only in pregnant women who are at elevated risk (second-line strategy), the number of invasive follow-up examinations and hence the risk of miscarriage could likely be reduced from the status quo. With this approach, however, nearly the same percentage of foetuses with trisomy 21 would still not be detected, namely those in pregnant women at lower risk. Nearly all foetuses with trisomy 21 would be detected if the test were used in all pregnant women. More invasive examinations would be performed in lower-risk pregnant women; the total number of invasive examinations would remain below the status quo in the considered scenarios. Including test failures in the considerations, however, may reverse this relationship. Therefore, it cannot be safely assumed that the number of invasive examinations will decrease when compared to the status quo.

The calculations provide a rough idea of the effects. Due to missing information, e.g., on the utilization rates for current prenatal diagnostics, particularly first-trimester screening, it is not possible to provide more specific quantitative information on the health care situation in Germany.

The full report (German version) is published under
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