NIPT

NON – **I**NVASIVE **P**RENATAL **T**ESTING, or NIPD (next generation non invasive prenatal diagnosis)?

Μη επεμβατικός προγεννητικός έλεγχος

NIPT ή NIPD…diagnosis

NON – INVASIVE PRENATAL TESTING

Testing of cff DNA (cell free fetal DNA)

Ελεγχος για τρισωμία 21, 18 και 13 από το

ελεύθερο εμβρυικό DNA (εξωκυττάριο-κυκλοφορούν)

από το αίμα της μητέρας

www.DOWNsyndromeNIPT.info

Εμβρυομητρική ιατρική: ραγδαία εξέλιξη ως προς τη διάγνωση, ενδομήτρια θεραπεία και ως προς τον προγεννητικό έλεγχο

Screening για τρισωμία 21:

- 1980 : Αμνιοκέντηση (advanced maternal age)
- 1990 : Τριπλό screening: **Ηλικία της μητέρας+Βιοχημικές παράμετροι: AFP, HCG, free oestriol -** (T21, T18 and T13) **(1) (ίδε επόμενη διαφάνεια 5)**
- **2000 : Screening 1ου τριμήνου- "combi" (T21, T18 and T13)** **(2) (ίδε διαφάνεια 6)**
- 2012 : Screening 1ου τριμήνου + **NIPT** (T21, T18 and T13)
- 2015 : NIPT (extensive genetic screening)

Fetal Medicine Foundation-Nucheal Translucency, ...

έρευνά του στην 11-13 εβδομάδα κυήσεως + αυχενική διαφάνεια πρότεινε ένα νέο μοντέλο φροντίδας, μάνας/εμβρύου "Turning the Pyramid of prenatal Care".

(1) Τριών βιοχημικών παραμέτρων- screening (> 1990)

- Ηλικία της μητέρας
- Βιοχημικές παράμετροι: AFP, HCG, free oestriol

Fetal Medicine Foundation-Nucheal Translucency, ...έρευνά του στην 11-13 εβδομάδα κυήσεως + αυχενική διαφάνεια πρότεινε ένα νέο μοντέλο φροντίδας, μάνας/εμβρύου "Turning the Pyramid of prenatal Care".

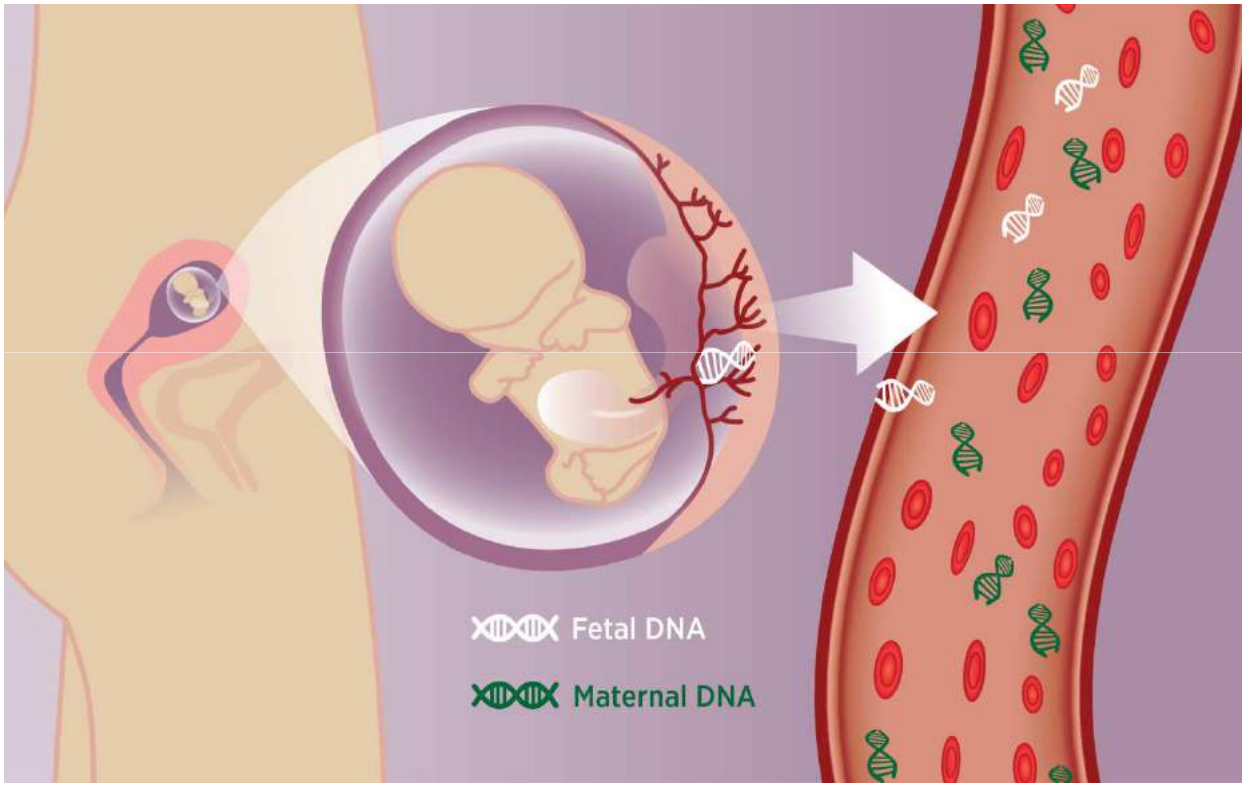
(2) έλεγχος 1ου τριμήνου Combi test» (> 2000 έτος)

- Ηλικία της μητέρας
- Αυχενική διαφάνεια (Nuchal translucency, NT)
- Βιοχημικές παράμετροι: free B-HCG, PAPP-A, και..σύντομα
- PLGF (Placental Growth factor)

NIPT

- 1997…

Η αρχή της μεθόδου: (1)Cell Free Fetal DNA (cff DNA) στο αίμα της μητέρας



Από τη 10η εβδομάδα ελεύθερο εμβρυικό DNA περνά στο αίμα της μητέρας. Εξ αυτού μπορεί να γίνει μοριακή ανίχνευση τρισωμιών

NIPT cff DNA (2)

- < 1 % συνολικό DNA στην μητρική κυκλοφορία είναι εμβρυικό

- 5-30 % του cell-free DNA στην μητρική κυκλοφορία είναι εμβρυικό !

NIPT για την τρισωμία 21

NIPT μετρά το λόγο της αλληλουχίας του

χρωμοσώματος 21

προς «control» αλληλουχία και χρήση

βιοπληροφορικής

NIPT -TECHNOLOGIES-

- **1. MPSS** massively parallel signature/shotgun sequencing πχ. **(Sequenom)** και
  MPSS with SAFeR **(Verinata)**
- **2. Targeted sequencing with forte (ARIOSA)**
  Targeted sequencing with SNPs **(Natera, Panorama)**

- Μαζική (1.) ή στοχευμένη αλληλούχιση (2.)+ βιοπληροφορική

NIPT : το ιστορικό

2013 : Καθημερινά > 2000 NIPT tests

παγκοσμίως!

NIPT

- Ποιο τέστ επιλέγουμε?

Ποια τέστ κυκλοφορούν?

- ARIOSA-HARMONY (US)
- VERINATA-Verifi prenatal test (US)
- NATERA -PANORAMA(US)
- SEQUENOM-Materni21 (US)
- -BGI -NIFTY (China)
- LIFE-CODEXX-prena test (Germany) και ακόμη μερικά Ευρωπαικά εργαστήρια «στήνουν την μέθοδο»

Διεθνής βιβλιογραφία και αξιολόγηση μεθόδων

- Όλα τα εμπορευματοποιημένα τέστ αναφέρονται στην διεθνή βιβλιογραφία
- Εχουν πραγματοποιηθεί μελέτες αξιολόγησης
- Υπάρχουν συγκριτικά δεδομένα

- ..ίδε (διαφάνειες 16-20)

Comparison of NIPT Technology Claims

Sensitivity False Positive Rate	Sequenom MaterniT21 plus	Verinata Verifi	Ariosa Harmony	Natera Panorama™
Methodology	**MPSS**	**MPSS with SAFeR**	**Targeted Sequencing with FORTE**	**Targeted Sequencing with SNPs**
Trisomy 21 (Down Syndrome)	**>99.9% 0.2%**	**>99.9% 0.2%**	**>99% <0.1%**	**>99% 0%**
Trisomy 18 (Edwards Syndrome)	**>99.9% 0.3%**	**97.4% 0.4%**	**>98% <0.1%**	**>99% 0%**
Trisomy 13 (Patau Syndrome)	**91.7% 0.9%**	**87.5% 0.1%**	**80% <0.1%**	**>99% 0%**
45,X (Monosomy X)	Not evaluated	**95.0% 1.0%**	Not evaluated	**>99% 0%**

(1) *Zimmermann et al. Prenat Diag 2012 (2) Natera Internal Data (3) Rabinowitz et al. Presented at ASHG 2012*
(2) *Downloaded on February 5, 2013 http://www.sequenomcmm.com/Home/Health-Care-Professionals/Trisomy-21/Performance-Data*
(3) *Downloaded on February 5, 2013 http://www.verinata.com/providers/provider-overview/*
(4) *Downloaded on February 5, 2013 http://www.ariosadx.com*

http://education.questdiagnostics.com/presentations/noninvasive-prenatal-testing-separate-but-not-equal?presentation_id=235

BGI-Health papers-

OPEN ACCESS Freely available online

PLoS one

Prenatal Detection of Aneuploidy and Imbalanced Ch… Se…

Shan
Wang
Zhan

1 Depar
Shenzhe

OPEN ACCESS Freely available online

Noninvasive Prenatal Diagnosis of Fetal Triso… Trisomy 13 by Maternal Plasma DNA Sequen…

Journal of Maternal-Fetal and Neonatal Medicine, 2012; Early Online: 1–5

ISSN 1476-7058 print/ISSN 1476-4954 online
DOI: 10.3109/14767058.2011.635730

No… an…

Tze…
She…

[1]Dep… of G… Gua…

The Journal of Maternal-Fetal and Neonatal Medicine, 2012; Early Online: 1–4

ISSN 1476-7058 print/ISSN 1476-4954 online
DOI: 10.3109/14767058.2012.678442

ORIGINAL ARTICLE

BMJ

Clin… **Noninvasive aneuploidy det…**

Tze K…
Hoi Y…

[1]Fetal …
Fetal M…

Hong Yao[1], Lei Zhang…
Jiang[2], Feng Mu[3], Lijia…

[1] Prenatal Diagnosis C…
Hospital, the Third M…
[2] BGI- Shenzhen, Shen…
[3]BGI-Wuhan, Wuhan, …

The Journal of Maternal-Fetal and Neonatal Medicine, 2012; Early Online: 1–4
© 2012 Informa UK, Ltd.
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DOI: 10.3109/14767058.2012.733768

informa
healthcare

SHORT REPORT

Non-invasive prenatal screening of fetal Down syndrome by maternal plasma DNA sequencing in twin pregnancies

Tze Kin Lau[1], Fuman Jiang[2], Mei Ki Chan[2], Hongyun Zhang[2], Pui Shan Salome Lo[1] & Wei Wang[2]

[1]*Fetal Medicine Centre, Paramount Clinic, Hong Kong and* [2]*BGI-Shenzhen, Shenzhen, China*

Non-invasive prenatal screening for fetal Down syndrome (NIFTY) by maternal plasma sequencing was performed in 12 subjects with twin pregnancies, including 11 with normal fetuses and 1 with discordant fetal Trisomy 21. For every sample, it was processed, sequenced and reported as soon as it was collected as other clinical samples for singleton pregnancies. The NIFTY test was negative in the 11 pregnancies carried normal fetuses, and was positive (high risk) in the case with discordant fetal Trisomy 21. The sensitivity and specificity were both 100%. This small case series suggested the NIFTY as a screening test for fetal Trisomy 21 is feasible in twin pregnancies.

Keywords: Down syndrome, fetal DNA, maternal serum, non-invasive prenatal diagnosis, twin pregnancies

Introduction

Prenatal detection of fetal Down syndrome by massively parallel sequencing (MPS) of maternal plasma DNA has been shown to be highly effective, with a detection rate of over 99% and a false positive rate of below 1% [1–4]. Recently, this technology has been used clinically as a screening test for fetal aneuploidy in singleton pregnancies [5]. However, the efficacy of detecting Down syndrome by MPS in twin pregnancies is still unclear because of the paucity of relevant information and studies.

Previous studies have showed that there was no significant MPS of 7 trisomy 21, 1 trisomy 13 and 7 euploid cases in a cohort of 25 twin pregnancies using stored samples [10].

Here, we reported the screening of fetal Down syndrome by MPS in 12 cases of twin pregnancies, including one with discordant fetal trisomy 21, in a real clinical situation where all samples were prospectively collected and assays immediately without storage in the exact same way as clinical samples for singleton pregnancies.

Methods and materials

The Non-Invasive Fetal Trisomy (NIFTY) test, a MPS-based screening test, was offered to pregnant women carrying a singleton pregnancy in Hong Kong as a screening test for fetal Down syndrome at or after 12 week of gestation since August 2011. The copy numbers of other chromosomes, including the sex chromosomes, were studied routinely. The test report included also risk assessment for Trisomy 18 (and Trisomy 13 as well since 2012) in addition to chromosome 21. Further details concerning the clinical and laboratory aspect of this test were as previously reported [5]. Specifically, each pregnant woman were given written information about the test, had an individual pre-test counseling and an ultrasound scan, and provided a written consent concerning the use of NIFTY as a Down syndrome screening test.

Although the NIFTY was only offered to women carrying singleton pregnancies, many women with twin pregnancies also requested it. In general, such requests were declined. They were

Non-invasive prenatal assessment of trisomy 21 by multiplexed maternal plasma DNA sequencing: large scale validity study

Rossa W K Chiu, professor,[1] Ranjit Akolekar, clinical research fellow,[3] Yama W L Zheng, student,[1] Tak Y Leung, professor,[2] Hao Sun, assistant professor,[1] K C Allen Chan, associate professor,[1] Fiona M F Lun, postdoctoral fellow,[1] Attie T J I Go, professor,[4] Elizabeth T Lau, department manager and honorary assistant professor,[5] William W K To, consultant,[6] Wing C Leung, consultant,[7] Rebecca Y K Tang, consultant,[8] Sidney K C Au-Yeung, consultant,[9] Helena Lam, consultant,[10] Yu Y Kung, obstetrician,[11] Xiuqing Zhang, manager,[12,13] John M G van Vugt, professor,[4] Ryoko Minekawa, postdoctoral fellow,[3] Mary H Y Tang, consultant and honorary clinical associate professor,[5] Jun Wang, professor,[12] associate director,[13] Cees B M Oudejans, associate professor,[4] Tze K Lau, professor,[2] Kypros H Nicolaides, professor,[3] Y M Dennis Lo, professor[1,12]

Ariosa Diagnostics

- Paper

DOI: 10.1002/pd.2922 PRENATAL DIAGNOSIS

ORIGINAL ARTICLE

Selective analysis of cell-free DNA in maternal blood for evaluation of fetal trisomy

Andrew B. Sparks[†1], Eric T. Wang
Naiping Shen[1], Jigna Doshi[1], Mich
Michael Mitchell[2], John Stuelpnage

[1]Aria Diagnostics, Inc., 5945 Optical C
[2]Medical College of Wisconsin, Milwa
*Correspondence to: Ken Song. E-mail:
[†]Authors contributed equally to the work

ABSTRACT

Objective To develop a novel pr
evaluation of fetal Trisomy 21 (

Methods Two hundred ninety-e
analyzed using a novel, highly m
from maternal blood samples wa
separate patients were pooled a
distinguish aneuploid samples f
evaluated at various sequence d

Results At the lowest sequencing
where distinguished from T21 a
depth to 410 000 counts per sam
increase to 620 000 counts per s
less than 5% of that required by

Conclusion Digital analysis of selected regions enables highly accurate, cost effi
aneuploidy assessment. © 2012 John Wiley & Sons, Ltd.

REPORTS OF MAJOR IMPACT www.AJOG.org

Noninvasive prenatal detection and selective analysis of cell-free DNA obtained from maternal blood: evaluation for trisomy 21 and trisomy 18

Andrew B. Sparks, PhD; Craig A. Strubl

OBJECTIVE: We sought to develop a novel bio
rithm for the prenatal evaluation of risk for fe
trisomy 18 (T18) using cell-free DNA obtainec

STUDY DESIGN: We assayed cell-free DNA
blinded validation set of pregnant women, co
T21, and 16 T18 pregnancies. We used digit
gions in combination with a novel algorithm
risk of trisomy evaluation (FORTE), to determ
subject.

RESULTS: In all, 163/171 subjects in the tr
control criteria. Using a Z statistic, 35/35 T21

REPORTS OF MAJOR IMPACT www.AJOG.org

Chromosome-selective sequencing of maternal plasma cell–free DNA for first-trimester detection of trisomy 21 and trisomy 18

Ghalia Ashoor, MD; Argyro Syngelaki, RM; Marion Wagner, MD; Cahit Birdir, MD; Kypros H. Nicolaides, MD

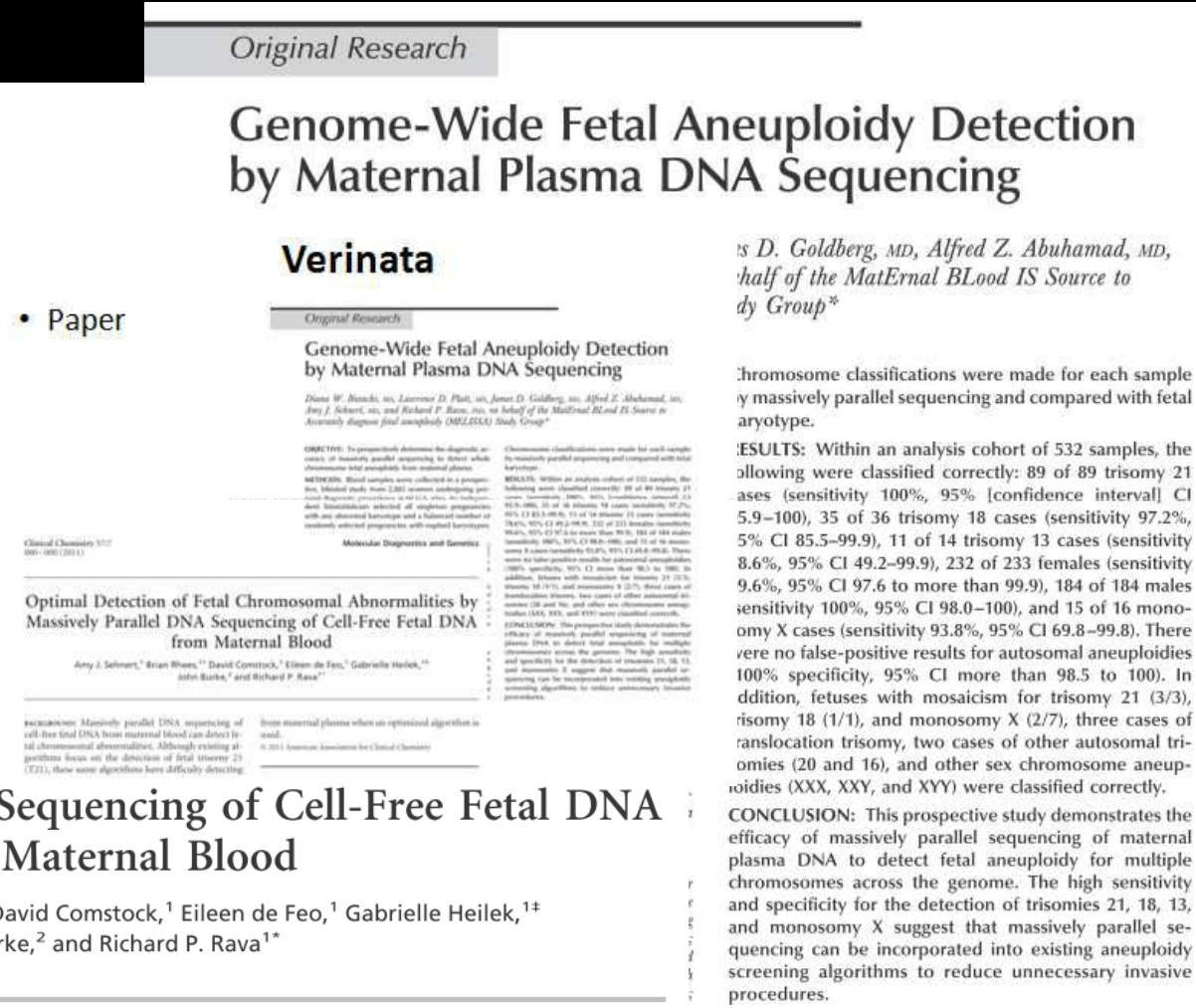
OBJECTIVE: The purpose of this study was to assess the prenatal detection rate of trisomy 21 and 18 and the false-positive rate by chromosome-selective sequencing of maternal plasma cell–free DNA.

STUDY DESIGN: Nested case-control study of cell-free DNA was examined in plasma that was obtained at 11-13 weeks before chorionic villous sampling from 300 euploid pregnancies, 50 pregnancies with trisomy 21, and 50 pregnancies with trisomy 18. Laboratory personnel were blinded to fetal karyotype.

cases, 98.8% in 1 case, 88.5% in 1 case, and 0.11% in 1 case. In 3 of the 300 euploid pregnancies (1%), no risk score was provided, because there was failed amplification and sequencing. In the remaining 297 cases, the risk score for trisomy 21 was ≤0.01%, and the risk score for trisomy 18 was ≤0.01% in 295 cases, 0.04% in 1 case, and 0.23% in 1 case. Therefore, the sensitivity for detecting trisomy 21 was 100% (50/50 cases); the sensitivity for trisomy 18 was 98% (49/50 cases), and the specificity was 100% (297/297 cases).

Verinata

- Paper



Original Research

Genome-Wide Fetal Aneuploidy Detection by Maternal Plasma DNA Sequencing

Verinata

• Paper

Original Research

Genome-Wide Fetal Aneuploidy Detection by Maternal Plasma DNA Sequencing

Optimal Detection of Fetal Chromosomal Abnormalities by Massively Parallel DNA Sequencing of Cell-Free Fetal DNA from Maternal Blood

Amy J. Sehnert, Brian Rhees, David Comstock, Eileen de Feo, Gabrielle Heilek, John Burke, and Richard P. Rava

Molecular Diagnostics and Genetics

*s D. Goldberg, MD, Alfred Z. Abuhamad, MD, half of the MatErnal BLood IS Source to dy Group**

hromosome classifications were made for each sample y massively parallel sequencing and compared with fetal aryotype.

ESULTS: Within an analysis cohort of 532 samples, the llowing were classified correctly: 89 of 89 trisomy 21 ases (sensitivity 100%, 95% [confidence interval] CI 5.9–100), 35 of 36 trisomy 18 cases (sensitivity 97.2%, 5% CI 85.5–99.9), 11 of 14 trisomy 13 cases (sensitivity 8.6%, 95% CI 49.2–99.9), 232 of 233 females (sensitivity 9.6%, 95% CI 97.6 to more than 99.9), 184 of 184 males sensitivity 100%, 95% CI 98.0–100), and 15 of 16 mono- omy X cases (sensitivity 93.8%, 95% CI 69.8–99.8). There ere no false-positive results for autosomal aneuploidies 100% specificity, 95% CI more than 98.5 to 100). In ddition, fetuses with mosaicism for trisomy 21 (3/3), risomy 18 (1/1), and monosomy X (2/7), three cases of ranslocation trisomy, two cases of other autosomal tri- omies (20 and 16), and other sex chromosome aneup- oidies (XXX, XXY, and XYY) were classified correctly.

CONCLUSION: This prospective study demonstrates the efficacy of massively parallel sequencing of maternal plasma DNA to detect fetal aneuploidy for multiple chromosomes across the genome. The high sensitivity and specificity for the detection of trisomies 21, 18, 13, and monosomy X suggest that massively parallel sequencing can be incorporated into existing aneuploidy screening algorithms to reduce unnecessary invasive procedures.

Clinical Chemistry 57:7
000–000 (2011)

Optimal Detection of F Massively Parallel DNA Sequencing of Cell-Free Fetal DNA from Maternal Blood

Amy J. Sehnert,[1] Brian Rhees,[1†] David Comstock,[1] Eileen de Feo,[1] Gabrielle Heilek,[1‡]
John Burke,[2] and Richard P. Rava[1*]

BACKGROUND: Massively parallel DNA sequencing of cell-free fetal DNA from maternal blood can detect fetal chromosomal abnormalities. Although existing algorithms focus on the detection of fetal trisomy 21 (T21), these same algorithms have difficulty detecting from maternal plasma when an optimized algorithm is used.

REPORTS OF MAJOR IMPACT www.AJOG.org

Noninvasive detection of fetal trisomy 21 by sequencing of DNA in maternal blood: a study in a clinical setting

Mathias Ehrich, MD; Cosmin Deciu, MSc; Tricia Zwiefelhofer; John A. Tynan, DPhil; Lesley Cagasan, MSc; Roger Tim, DPhil; Vivian Lu; Ron McCullough, DPhil; Erin McCarthy; Anders O. H. Nygren, DPhil; Jarrod Dean; Lin Tang, DPhil; Don Hutchison, MSc; Tim Lu, DPhil; Huiquan Wang, DPhil; Vach Angkachatchai, DPhil; Paul Oeth, MSc; Charles R. Cantor, DPhil; Allan Bombard, MD; Dirk van den Boom, DPhil

©American College of Medical Genetics
Open

ORIG

DNA sequencing of mat trisomy 18 and trisomy an internation

Glenn E. Palomaki, PhD[1], Co
Geralyn M. Lambert-Messerlian, PhD
Mathias Ehrich, MD[3], Dirk van de
Wayne W. Grody, MD, PhD[5,7], Star

Purpose: To determine whether maternal plasma cell-free sequencing can effectively identify trisomy 18 and 13.

Methods: Sixty-two pregnancies with trisomy 18 and 12 w somy 13 were selected from a cohort of 4,664 pregnancies alon matched euploid controls (including 212 additional Down syn and matched controls already reported), and their samples using a laboratory-developed, next-generation sequencing test pretation of the results for chromosome 18 and 13 included ment for CG content bias.

Results: Among the 99.1% of samples interpreted (1,971/ observed trisomy 18 and 13 detection rates were 100% (59/5 91.7% (11/12) at false-positive rates of 0.28% and 0.97%, respe Among the 17 samples without an interpretation, three were t 18. If z-score cutoffs for trisomy 18 and 13 were raised slight

ARTICLE

DNA sequencing of maternal plasma to detect Down syndrome: An international clinical validation study

Glenn E. Palomaki, PhD[1], Edward M. Kloza, MS[1], Geralyn M. Lambert-Messerlian, PhD[1], James E. Haddow, MD[1], Louis M. Neveux, BA[1], Mathias Ehrich, MD[2], Dirk van den Boom, PhD[2], Allan T. Bombard, MD, MBA[2,3,4], Cosmin Deciu, MSc[2], Wayne W. Grody, MD, PhD[5], Stanley F. Nelson, MD[6], and Jacob A. Canick, PhD[1]

Purpose: Prenatal screening for Down syndrome has improved, but the number of resulting invasive diagnostic procedures remains problematic. Measurement of circulating cell-free DNA in maternal plasma might offer improvement. Methods: A blinded, nested case–control study was designed within a cohort of 4664 pregnancies at high risk for Down syndrome. Fetal karyotyping was compared with an internally validated, laboratory-developed test based on next-generation sequencing in 212 Down syndrome and 1484 matched euploid pregnancies. None had been previously tested. Primary testing occurred at a CLIA-certified commercial laboratory, with cross validation by a CLIA-certified university laboratory. Results: Down syndrome detection rate was 98.6% (209/212), the false-positive rate was 0.26% (381/471), and the testing failed in 13 pregnancies (0.8%), all were euploid. Before unblinding, the primary testing laboratory also reported multiple alternative interpretations. Adjusting chromosome 21 counts for genome cytosine base content had the largest impact on improving performance. Conclusion: When applied to high-risk pregnancies, measuring maternal plasma DNA detects nearly all cases of Down syndrome at a very low false-positive rate. This method can substantially reduce the need for invasive diagnostic procedures and attendant procedure-related fetal loss. Although implementation issues need to be addressed, the evidence supports introducing this testing on a clinical basis. *Genet Med* 2011:XX(XX):000–000.

Key Words: *Down syndrome; prenatal screening; massively parallel shotgun sequencing; fetal DNA; clinical validation; detection rate; false-positive rate*

Currently, the most effective prenatal screening tests for Down syndrome combine maternal age with information from sonographic measurement of nuchal translucency in the first trimester and measurements of several maternal serum screening markers obtained in the first and second trimesters.[1–3] This approach detects up to 90% of all cases at a false-positive rate of 2%. Given the prevalence of Down syndrome, 1 of every 16 screen positive women offered invasive diagnostic testing (amniocentesis or chorionic villus sampling) will have an affected pregnancy and 15 will not. As many as 1 in 200 such invasive procedures are associated with fetal loss, a major adverse consequence of prenatal diagnosis.[3,4] This has led to adjusting screening cutoffs to minimize the false-positive rate. In practice, false-positive rates of 5% are common.

Προτεινόμενη: Ariosa-Harmony US

Ariosa -Harmony

- Μέθοδος επιβεβαιωμένη για όλες τις ηλικίες
- Στοχευμένη αλληλούχιση με FORTE
- Η περισσότερο μελετημένη μέθοδος NIPT σε γυναίκες μικρότερες και μεγαλύτερες των 35 ετών.
- Στο αποτέλεσμα αναφέρεται το % του cffDNA
- Μελέτες (τυφλές κλινικές) σε περισσότερες από 22,000 γυναίκες
- Σε περισσότερες από 300,000 κυήσεις
- Διατίθεται σε 90 χώρες

NIPT : βασικά χαρακτηριστικά του τέστ

1. **TEST :** trisomy 21 /18/13 και το φύλο,
2. **Δείγμα:** ειδικά κίτ Shrek kit
3. **Πότε γίνεται ?** > από την 10η βδομάδα
4. **Αποτέλεσμα:** < 2 εβδ
5. **Αξιοπιστία:** 99% για την τρισωμία 21
6. **Ενδείξεις:** η NIPT είναι ενδεδειγμένη ειδικά σε:
   - Αν το τριπλό τέστ 1ου τριμήνου βγαίνει «υψηλού κινδύνου»
   - Αν η ηλικία της μητέρας είναι μεγάλη
   - Ανησυχία για την επεμβατική μέθοδο
7. **Αστοχη χρήση:** Η NIPT δεν προτιμάται όταν :
   - Υπάρχουν εμβρυικές ανωμαλίες στον υπέρηχο
   - Πολύ μεγάλη αυχενική διαφάνεια με φυσιολογική PAPP-A και free B HCG
   - Τρίδυμος κύηση ή νεκρά δίδυμα
8. **Τιμή: ….. Τελική στον ασθενή:….? Γιατί σε μία επιστημονική παρουσίαση υπεισέρχεται θέμα τιμής? Συμφωνία να μην υπερβαίνει ένα ανώτατο όριο τιμής.**

Ευαισθησία της NIPT –HARMONY ARIOSA για T21, T18, T13

Ευαισθησία

T21 : 99 %

T18 : 98 %

T13 : 90 %

Ψευδώς αρνητικά

Αν η NIPT είναι Φυσ, ο ενδογενής κίνδυνος της μεθόδου για τρισ. 21, 18, 13 : < 1 / 1.000

Ειδικότητα της NIPT –HARMONY ARIOSA για T21, T18, T13

Ειδικότητα

T21 > 99.9 %

T18 > 99.9 %

T13 > 99.9 %

Ψευδώς θετικά

Αν η NIPT είναι παθολογική, ο κίνδυνος για μην παρουσιάζει το έμβρυο τρισωμίες είναι απειροελάχιστος μηδενικός

NIPT : ερμηνεία αποτελέσματος

1. **Φυσιολογικό: δεν χρειάζεται περαιτέρω ειδικό** follow up , εκτός αν υπάρξει υπερηχογραφική ένδειξη

2. **Αποτυχία του τέστ:** σε περίπου 3 % των κυήσεων δεν απομονώνεται αρκετό εμβρυικό DNA :
   Γίνεται επανάληψη χωρίς επιβάρυνση (όλες οι μέθοδοι)

3. **Παθολογικό αποτέλεσμα:** αμνιοκέντηση ή λήψη τροφοβλάστης

NIPT ή τέστ 1ου τριμήνου (FTS)?

	FTS	NIPT
Ψευδώς αρνητικά	25 %	μέχρι 2 %
Ψευδώς θετικά	5 % (> 95 % of positives)	< 0.1 % (< 5 % of positives)
Αποτέλεσμα	> Week 13	> Week 10
τιμή	120-160 euro	480-590 Euro

IONA TEST, UK = για in-house εφαρμογή, (το 1ο CE- IVD, Ιανουάριος 2015)

…The IONA® test has been developed to meet the needs of clinical laboratories, doctors and pregnant women:

- Automated standardised workflow
- Robust, accurate and reliable
- Bespoke Analysis software
- **Quality CE Marked *in vitro* diagnostics**
- Run control-Identify changes in results that could occur due to variability within sequencing reagents

NIPT ? Ναι ή όχι? Επιλεκτικά-ακολουθώντας οδηγίες διεθνών οργανισμών!

The American College of Obstetricians and Gynecologists
WOMEN'S HEALTH CARE PHYSICIANS

The Society for Maternal-Fetal Medicine

COMMITTEE OPINION

Number 545, December 2012

The American College of Obstetricians and Gynecologists Committee on Genetics
The Society for Maternal-Fetal Medicine Publications Committee

This document reflects emerging clinical and scientific advances as of the date issued and is subject to change.

The information should not be construed as dictating an exclusive course of treatment or procedure to be followed.

Noninvasive Prenatal Testing for Fetal Aneuploidy

NIPT : το μέλλον

1. Array Comparative Genomic Hybridization
   (συνδιασμός microarrays+στοχευμένος υβριδισμός)
   - Όλα τα χρωμοσώματα
   - Μικρο -ελλείψεις/ διπλασιασμούς
2. Ανίχνευση συνηθισμένων μονογονιδιακών μεταλλάξεων
3. Ολόκληρο το γονιδίωμα (exome / genome sequencing)

Ευχαριστώ!