892

Confirmed maternal neoplasms detected via informaSeq® non-invasive prenatal screening

Jordan D Dix, MS, CGC; Michelle Burch, MS, CGC; Amy C Dexter, MS, CGC; Emily Walsh, MS, CGC; Christine Vaughan, MS, CGC, Chevonne D Eversley, PhD, FACMG
Center for Molecular Biology and Pathology, Laboratory Corporation of America® Holdings, Research Triangle Park, North Carolina

Integrated GENETICS
LabCorp Specialty Testing Group

I. Introduction

Importance

Non-invasive prenatal screening (NIPS) has become a vastly utilized screening method in recent years. While NIPS boasts much higher specificity and sensitivity rates than standard maternal serum screening, it poses unique challenges. For instance, literature suggests that some maternal malignancies can be identified via NIPS, and therefore impact results.[1]

Objective

To discuss the findings of Integrated Genetics' informaSeq® NIPS results with regard to confirmed maternal malignancies and benign tumors.

II. Study Design

Patient samples were received for routine NIPS and analyzed by means of massively parallel sequencing. Abnormal results were recorded in a database maintained by the genetic counselors, and follow-up information was collected 6 weeks post-results and post-delivery, if needed. For the purposes of this study, the database was searched using the keywords: lymphoma, cancer, malignancy, tumor, fibroid, and mass.

III. Results

Over 400,000 samples have been received for informaSeq NIPS. 179 samples were positive for multiple chromosomal aneuploidies and/or an atypical pattern that required special interpretation. Of those, 17 cases had a confirmed maternal malignancy or benign tumor: five related to lymphoma, four a breast cancer diagnosis, two associated with the thyroid, two maternal fibroids, two pituitary adenoma, one stage IV tracheal carcinoma, and one a confirmed but unspecified maternal cancer in addition to fibroids. Seven of the cases resulted as multiple aneuploidies being detected, six of which also discussed an atypical pattern, six additional cases reported as a single aneuploidy but with an atypical pattern, three more cases reported with just an atypical pattern, and one case was reported as simply a single aneuploidy. Of note, trisomy 13 was indicated in 8/17 (47%) of the cases.

Table 1. Reported Non-Invasive Prenatal Screening Result and Corresponding Maternal Malignancy and Fetal Outcome

Case #	Reported informaSeq Result	Maternal Cancer	Fetal Outcome
1	Turner syndrome, atypical pattern	Non-Hodgkin's lymphoma	Unavailable
2	T21, XXX, atypical pattern	Hodgkin's lymphoma	No known fetal testing
3	T13, inconclusive sex, atypical pattern	Hodgkin's lymphoma	Amnio: 46,XY and nl array
4	T21 and T13	Lymphoma	Unavailable
5	Atypical pattern	Lymphoma	Unavailable
6	T13, Turner syndrome, atypical pattern	Breast cancer	Unavailable
7	T21 and T13, atypical pattern	Breast cancer	Amnio: 46,XY and nl array
8	T18, XXX, atypical pattern	Breast cancer	Fetal dx declined
9	T21, atypical pattern	Breast cancer	Fetal u/s normal
10	Borderline T21, T18, T13, atypical pattern	Benign thyroid mass	Amnio: 46,XY
11	Atypical pattern	Thyroid cancer	Unavailable
12	T18	Fibroids and IU bleed	Fetal dx declined
13	Atypical pattern	At least one fibroid	Fetal dx declined
14	T21, T18, T13, atypical pattern	Fibroid plus unspecified, but confirmed, cancer	Fetal dx declined
15	T21, atypical pattern	Pituitary macroadenoma	T21 confirmed at birth, karyotype unavailable
16	T13, atypical pattern	Pituitary adenoma	Fetal u/s normal
17	T13, atypical pattern	Stage IV tracheal carcinoma	Unavailable

u/s=ultrasound; dx=diagnostic testing; IU=intrauterine

Figure 1. Plot showing autosomal chromosome (a) positive control, (b) aneuploidy detected sample, (c) aneuploidy suspected sample, and (d) negative control

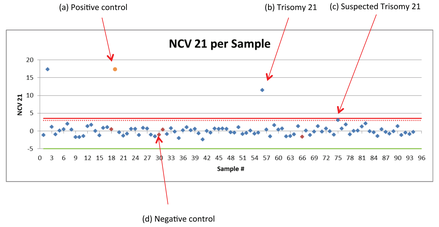


Figure 2. Plot showing sex chromosomes for (a) autosome positive control, (b) male control, (c) female control, and (d) unclassified for gender.

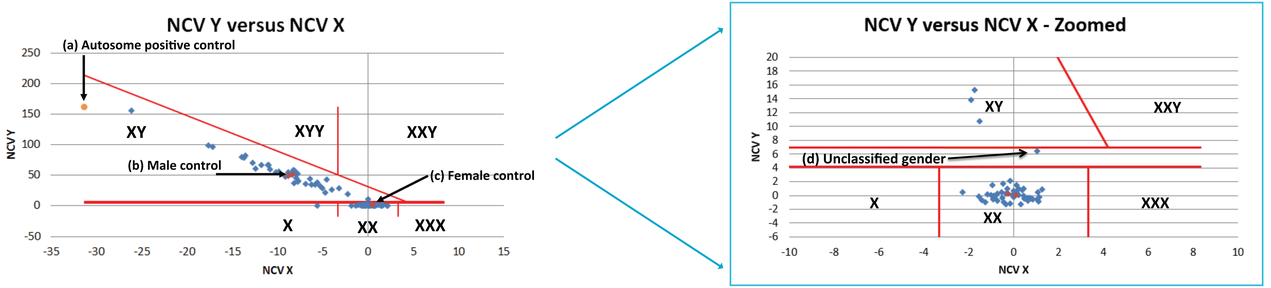


Figure 3. Case 9 NCV plots for (a) chromosome 21, (b) chromosome 18, and (c) chromosome 13.

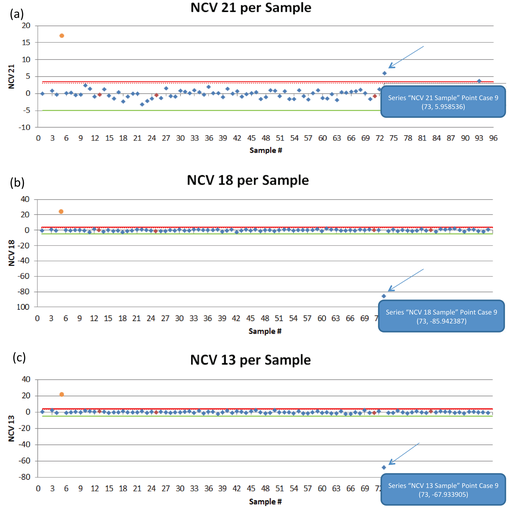
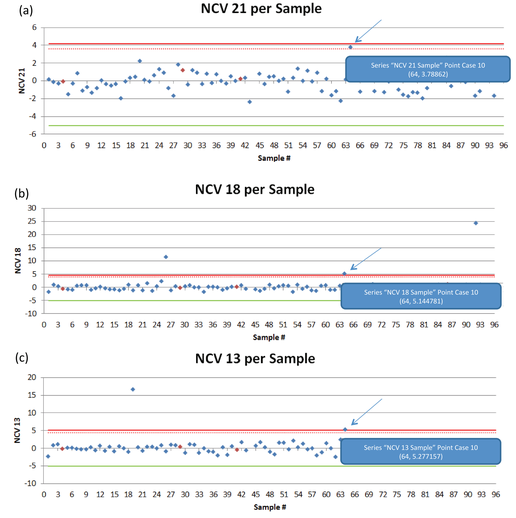


Figure 4. Case 10 NCV plots for (a) chromosome 21, (b) chromosome 18, and (c) chromosome 13.



IV. Conclusion

This research adds to the evidence that maternal neoplasms can affect the results of non-invasive prenatal screening. These examples also show the variety of NIPS results that have been reported for patients experiencing maternal malignancy. Patients should be counseled appropriately that such results are possible when considering NIPS as a screening option. Future research may aim to develop guidelines for providers on how to follow-up when such results are received.

V. References

1. Bianchi, DW et al. Noninvasive prenatal testing and incidental detection of occult maternal malignancies. *JAMA*. 2015; 314(2):162-169.

LabCorp

Integrated Genetics is a brand used by Esoterix Genetic Laboratories, LLC, a wholly owned subsidiary of Laboratory Corporation of America® Holdings.
Poster presented at the ISPD® 39th Annual Pregnancy Meeting; 2019 February 7-10; Las Vegas, NV.