Application of ancillary testing in the diagnosis of hydatidiform mole: A comparison of genotyping and ploidy

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Background:

- Diagnosis of hydatidiform mole is improved through the use of ancillary diagnostic methods such as ploidy or genotyping.
- There is still discussion regarding the need for, and selection of, ancillary methods.
- Purpose: To evaluate the performance of two commonly used ancillary methods, ploidy and STR genotyping.

Methods:

- **72 POCs** with suspicion of mola hydatidosa. Both ploidy and genotyping attempted.
- Final diagnosis: Combination of histology, p57 immunohistochemistry, ploidy and genotyping.
- Ploidy analysis: Image cytometry AHRENS ICM Cytometry System (Medtechnische Beratung, Hamburg, Germany).
- STR genotyping: DNA from microdissected maternal and fetal tissue. Analyzed using AmpFISTR Identifier (Applied Biosystems, Foster City, USA), followed by quantitative capillary electrophoresis, and interpretation.

Results:

- Final diagnosis of the 72 cases: 42 partial moles (PM), 14 complete moles (CM) and 14 non-molar gestations.
- Ploidy analysis was successful in 50/72 cases (70%) and genotyping was successful in 60/72 cases (83%).
- The most common reason for failure in ploidy analysis was difficulty in interpreting the generated ploidy curves.
- The most common reason for failure in genotyping was mixing of maternal and villous material for analysis.
- Of the 22 cases where ploidy failed, there were 12 PM, 7 CM, 2 non-molar gestations, and one mole of unclear type.
- Of the 12 cases where genotyping failed, there were 4 PM, one complete mole, 5 non-molar gestations and 2 moles of unclear type.
- Both ancillary tests failed in 3 cases, of which there was one partial mole, one non-molar gestation, and one a mole of unclear type.

Conclusion:

- Genotyping appears to be the more reliable method, with failure in a smaller percentage of cases. Method failure was a result of a lack of clean, non-contaminated, material.
- Careful attention to dissection is a critical lab step which should be carefully evaluated in lab quality control. This step can also be improved by more advanced methods such as laser capture microdissection.
- The majority of POCs could be classified using both methods.
- There was no clear relationship between method failure and final diagnosis.

Figure 1. Representative case examples.

(Upper): PLOIDY FAILURE. Biphasic ploidy curve. Paternal only genotyping. Mix of diploid and tetraploid cells.

(Middle): GENOTYPING FAILURE: The genotyping is contaminated.

(Lower box): Consistent results in all analyses.

Total nr of cases:	72
Final diagnosis	42 Partial mole (PM)
	14 Complete mole (CM)
	14 Non-molar (NML)
Ploidy analysis	
Successful	50/72
	12 PM, 7 CM, 2 NML
STR Genotyping	
Successful	60/72
	4 PM, 1 CM, 5 NML

Table 1. Summary of results.

The combined analyses indicate that STR genotyping is a robust method, but pure villous and maternal material must be obtained.

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