Does *ATM* gene positivity change breast cancer screening recommendations?

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**BACKGROUND**

- Next generation sequencing technologies have led to plummeting costs and enables the simultaneous analysis of multiple genes (commonly referred to as "multi-gene tests").
- Multi-gene tests can include high and moderate penetration genes.
- *ATM* is a moderate penetrance gene that confers a >20% lifetime risk of breast cancer.
- Individuals with a ≥20% lifetime risk of breast cancer should consider high risk breast surveillance (annual mammogram and annual MRI).17
- Carrier frequency for *ATM* mutations in the Caucasian population is 1/100

**RESULTS**

**FDR LIFETIME BREAST CANCER RISK ESTIMATES**

- 41.9% of FDR had a lifetime breast cancer risk ≥ 20% based on family history alone

**SDR LIFETIME BREAST CANCER RISK ESTIMATES**

- 3.2% of SDR had a lifetime breast cancer risk ≥ 20% based on family history alone

**CONCLUSIONS**

- A positive result in what is currently defined as a moderate penetrance gene may not impact cancer risk, genetic testing would be recommended based on family history alone.
- Some relatives who have not undergone genetic testing for a known familial *ATM* mutation may already have a lifetime risk of breast cancer that exceeds 20%, thus results may not alter breast cancer surveillance.
- Negative genetic test results for individuals within *ATM* carrier families may not be reassuring for breast cancer risk as there could be additional genetic risk factors influencing cancer risk.
- Data suggests cancer risk management based on *ATM* positivity more frequently impacts SDR than FDR.
- When testing for moderate penetrance breast cancer genes, family history is an important tool to provide indication for testing and high-risk breast cancer surveillance recommendations.

**PEDESTRIAN EXAMPLES**

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**METHODS**

- A registry based sample of 18 *ATM* mutation carriers was used to abstract data for female first degree relatives (FDR) and second degree relatives (SDR) who met the following criteria:
  - Age ≤ 80
  - Without a diagnosis of breast cancer
  - Current age recorded

- Breast cancer risk was assessed for each individual through the Breast and Ovarian Analysis of Disease Incidence and Carrier Estimation Algorithm (BOADICEA).

- Summary statistics were generated based on level of breast cancer risk which is determined by family breast cancer history for relatives of *ATM* mutation carriers.

**REFERENCES**