ATM gene

Associated Syndrome Name: *ATM*-associated Cancer Risk

ATM Summary Cancer Risk Table

CANCER	GENETIC CANCER RISK
Female Breast	High Risk
Pancreatic	Elevated Risk

ATM gene Overview

ATM-associated Cancer Risk [1, 2, 3, 4, 5, 6, 7]

- Women with *ATM* mutations have a risk for breast cancer that is significantly increased over the 12.5% lifetime risk for women in the general population of the United States. The increase in risk may be especially significant at young ages.
- *ATM* mutations have been found in families with 2 or more cases of pancreatic cancer in close relatives, indicating that there is an increased risk for pancreatic cancer in men and women with *ATM* mutations. The exact risk is unknown.
- Although there is not yet sufficient evidence to show an overall increase in prostate cancer risk for men with mutations in *ATM*, there is some evidence that prostate cancers that do develop are more likely to be aggressive. However, these studies are not conclusive and there are currently no medical management guidelines to address this possible risk.
- There have been studies to investigate the possibility that patients with *ATM* mutations have an increased risk for a wide range of cancers other than breast and pancreatic cancer, including evidence for a small increase in the risk for ovarian cancer. However, the data are not conclusive at this time and there are currently no medical management guidelines related to these cancers.
- Although there are increased risks for cancer in men and women with mutations in *ATM*, there are interventions that may reduce these risks. Guidelines from the National Comprehensive Cancer Network (NCCN) that may apply are listed below. Since information about the cancer risks associated with *ATM* mutations is relatively new, and there is still some uncertainty about the best ways to reduce these risks, it may be appropriate to interpret these results in consultation with cancer genetics experts in this emerging area of knowledge.

ATM gene Cancer Risk Table

CANCER TYPE	AGE RANGE	CANCER RISK	RISK FOR GENERAL POPULATION [8]
Female Breast	To age 50[3]	Up to 9%	1.9%
	To age 80[1, 2, 3]	17%-52%	10.2%
Pancreatic	To age 80[4]	Elevated risk	1%

ATM Cancer Risk Management Table

The overview of medical management options provided is a summary of professional society guidelines as of the last Myriad update shown on this page. The specific reference provided (e.g., NCCN guidelines) should be consulted for more details and up-to-date information before developing a treatment plan for a particular patient.

This overview is provided for informational purposes only and does not constitute a recommendation. While the medical society guidelines summarized herein provide important and useful information, medical management decisions for any particular patient should be made in consultation between that patient and his or her healthcare provider and may differ from society guidelines based on a complete understanding of the patient's personal medical history, surgeries and other treatments.

CANCER TYPE	PROCEDURE	AGE TO BEGIN	FREQUENCY (UNLESS OTHERWISE INDICATED BY FINDINGS)
Female Breast	Breast awareness - Women should be familiar with their breasts and promptly report changes to their healthcare provider. Periodic, consistent breast self-examination (BSE) may facilitate breast awareness.[11]	Individualized	NA
	Clinical encounter, including clinical breast exam, ongoing risk assessment and risk-reduction counseling[11]	When genetic risk is identified	Every 6 to 12 months
	Mammography with consideration of tomosynthesis and consideration of breast MRI with contrast[10]	Age 40, or modified to a younger age based on the family history of breast cancer	Annually
	Consider additional risk-reduction strategies.[10, 11]	Individualized	NA
Pancreatic	For patients with a family history of pancreatic cancer, consider available options for pancreatic cancer screening, including the possibility of endoscopic ultrasonography (EUS) and MRI/magnetic resonance cholangiopancreatography (MRCP). It is recommended that patients who are candidates for pancreatic cancer screening be managed by a multidisciplinary team with experience in the screening for pancreatic cancer, preferably within research protocols.[12, 13]	Age 50, or 10 years younger than the earliest age of pancreatic cancer diagnosis in the family	Annually
	Provide education about smoking cessation to reduce pancreatic cancer risk[13]	Individualized	Individualized
For Patients With A Cancer Diagnosis	For patients with a gene mutation and a diagnosis of cancer, targeted therapies may be available as a treatment option for certain tumor types (e.g., platinum chemotherapy, PARP-inhibitors)[9]	NA	NA

Information for Family Members

The following information for Family Members will appear as part of the MMT for a patient found to have a mutation in the *ATM* gene.

A major potential benefit of myRisk genetic testing for hereditary cancer risk is the opportunity to prevent cancer in relatives of patients in whom clinically significant mutations are identified. Healthcare providers have an important role in making sure that patients with clinically significant mutations are informed about the risks to relatives, and ways in which genetic testing can guide lifesaving interventions.

In rare instances, an individual may inherit mutations in both copies of the *ATM* gene, leading to the condition Ataxia-Telangiectasia (A-T). Most individuals with A-T will have symptoms in childhood, including neuronal degeneration, radiosensitivity and immunological deficiency. There is also a high risk of cancer, primarily leukemias and lymphomas. The children of this patient are at risk of inheriting A-T only if the other parent is also a carrier of an *ATM* mutation. It may be appropriate to screen the spouse/partner of this patient for *ATM* mutations.[14]

References

1. Ahmed M, Rahman N. *ATM* and breast cancer susceptibility. Oncogene. 2006 25:5906-11. PMID: 16998505.
2. Swift M, et al. Incidence of cancer in 161 families affected by ataxia-telangiectasia. N Engl J Med. 1991 325:1831-6. PMID: 1961222
3. Thompson D, et al. Cancer risks and mortality in heterozygous *ATM* mutation carriers. J Natl Cancer Inst. 2005 97:813-22. PMID: 15928302.
4. Roberts NJ, et al. *ATM* mutations in patients with hereditary pancreatic cancer. Cancer Discov. 2012 2:41-6. PMID: 22585167.
5. Kurian A, et al. Breast and Ovarian Cancer Penetrance Estimates Derived From Germline Multiple-Gene Sequencing Results in Women. JCO Precision Oncol. 2017 Epub ahead of print June 27, 2017.
6. Lilyquist J, et al. Frequency of mutations in a large series of clinically ascertained ovarian cancer cases tested on multi-gene panels compared to reference controls. Gynecol Oncol. 2017 [Epub ahead of print] PubMed PMID: 28888541.
7. Giri VN, et al. Role of Genetic Testing for Inherited Prostate Cancer Risk: Philadelphia Prostate Cancer Consensus Conference 2017. J Clin Oncol. 2018 36:414-424. PMID: 29236593.
8. Fast Stats: An interactive tool for access to SEER cancer statistics. Surveillance Research Program, National Cancer Institute. https://seer.cancer.gov/faststats. (Accessed on 1-2-2017)
9. Armstrong DK, et al. NCCN Clinical Practice Guidelines in Oncology®: Ovarian Cancer. V 2.2018. March 9. Available at http://www.nccn.org.
10. Daly M et al. NCCN Clinical Practice Guidelines in Oncology®: Genetic/Familial High-Risk Assessment: Breast and Ovarian. V 2.2019. July 30. Available at http://www.nccn.org.
11. Bevers TB, et al. NCCN Clinical Practice Guidelines in Oncology®: Breast Cancer Screening and Diagnosis. V 2.2018. May 18. Available at http://www.nccn.org.
12. Canto MI, et al. International Cancer of the Pancreas Screening (CAPS) Consortium summit on the management of patients with increased risk for familial pancreatic cancer. Gut. 2013 62:339-47. PMID: 23135763.
13. Syngal S, et al. ACG clinical guideline: Genetic testing and management of hereditary gastrointestinal cancer syndromes. Am J Gastroenterol. 2015 110:223-62. PMID: 25645574.
14. Gatti R, Perlman S. Ataxia-Telangiectasia. 2016 Oct 27. In: Pagon RA, et al., editors. GeneReviews® [Internet]. Available from http://www.ncbi.nlm.nih.gov/books/NBK26468/ PMID: 20301790.

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