BC Cancer Agency | Hereditary Cancer Program
CARE + RESEARCH
An agency of the Provincial Health Services Authority

Multiple Endocrine Neoplasia Type 1 (MEN1)

MEN1 is an autosomal dominant syndrome caused by germline mutations in the *MEN1* gene. Endocrine tumours come to attention because of the overproduction of hormones and/or tumour growth.

A clinical MEN1 diagnosis requires the diagnosis of 2 endocrine tumours in the parathyroid, pituitary and/or gastro-entero-pancreatic (GEP) tract. MEN1 is also associated with a number of other endocrine (e.g. carcinoid, adrenocortical) and non-endocrine tumours (e.g. facial angiofibromas, collagenomas, lipomas, meningiomas, ependymomas, leiomyomas) in some families.

MEN2 is a separate syndrome with medullary thyroid cancer and pheochromocytoma as key features.

Referral Criteria

*Note: **close relatives** include: children, brothers, sisters, parents, aunts, uncles, grandchildren & grandparents **on the same side of the family**. History of cancer in cousins and more distant relatives from the same side of the family may also be relevant.*

- family member with a confirmed *MEN1 g*ene mutation – refer for carrier testing
- a person with 2 or more of the 3 key *MEN*1-associated tumours:
  - **parathyroid** tumour or hyperplasia (primary hyperparathyroidism)
  - **pituitary** adenoma (prolactinoma is the most common)
  - well-differentiated **gastro-entero-pancreatic** neuroendocrine tumour (e.g. gastrinoma, insulinoma, glucagonoma, pancreatic islet tumour, VIPoma)
- a person with gastro-entero-pancreatic NET (neuroendocrine tumour) before age 40
- a person with parathyroid tumour or hyperplasia before age 40
- a person with primary hyperparathyroidism and a close relative with the same diagnosis
- a person with features described above and close relative(s) with related tumours
- a person with a close relative with features described above
- a person with additional endocrine and non-endocrine features associated with MEN1 may be referred for assessment

Referral of children is appropriate for this syndrome because it may inform their medical management.

Lifetime Cancer/Other Risks for *MEN1* mutation carriers

People with an *MEN1* gene mutation have an increased risk to develop endocrine and non-endocrine tumours over a lifetime. These include:

- Parathyroid adenoma/hyperplasia: 90-95%, usually by age 20-25, rarely malignant
- Pituitary adenoma: 30-40%, prolactinoma is most common, rarely malignant
- Gastro-entero-pancreatic NET: 30-80% risk for all types combined, high malignant potential
- Adrenocortical tumour: 40%, low malignant potential
- Meningioma: 5-8%, often asymptomatic, low malignant potential
- Bronchopulmonary NET: 2%, usually indolent
- Thymic NET: 2%, high malignant potential
- Other features: facial angiofibromas up to 85%, collagenomas up to 70%, lipomas 30%

Cancer Risk Management Recommendations for *MEN1* families

Note: The recommendations provided below are general in nature. Individualized recommendations based on personal and/or family medical histories may be provided through Hereditary Cancer Program assessment and/or by other specialists involved in a person's current care.

It is most important to have a regular program of clinical monitoring by a physician or team familiar with the MEN1 spectrum. After a tumour is detected in a particular organ, ongoing screening of that organ should be individualized. Risk management should occur in those with a known *MEN1* gene mutation and their first-degree relatives who have not undergone carrier testing.

The following recommendations are adapted from https://www.eviq.org.au/:

- annual physical examination with attention to visual fields from age 10
- annual prolactin measurement from age 10; consider annual IGF-1
- annual fasting calcium, phosphate and PTH from age 10
- annual evaluation of fasting gastrointestinal tract hormone profile from age 15
- MRI of chest, pancreas, duodenum, adrenal glands (or endoscopic ultrasound as appropriate) every 2 years from age 20
- MRI of brain (with high resolution pituitary images) every 3 years from age 10
- management of facial angiofibromas, lipomas and collagenomas is usually conservative, but local excision may be appropriate in some cases

Additional information

The following websites offer support and information which may be helpful to people living with MEN1*:*

- NET Patient Foundation: www.netpatientfoundation.org
- AMEND: www.amend.org.uk
- American MEN Support: http://amensupport.org/

References available on request.
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