European Guidelines for the Diagnosis and Management of BHD
(Menko *et al*., 2009)

Lay Summary

Who wrote this paper?

A group of 10 BHD clinicians, researchers and members of the BHD Foundation, on behalf of the European BHD Consortium. Together, this group has extensive experience and knowledge of BHD syndrome.

What is this paper about?

This paper describes the symptoms of BHD and recommends steps to diagnose and manage BHD syndrome.

What does the paper say?

Symptoms

BHD patients normally develop skin lesions after the age of 20. Lesions are usually found on the face, neck, ears or upper body. They are usually either fibrofolliculomas or trichodiscomas, but other types, like angiofibromas have been reported.

Renal cell carcinoma is the most life-threatening symptom of BHD. Although it is difficult to calculate how many BHD patients are at risk, one study has found that 27% (nearly 3 in 10) of BHD patients develop kidney cancer. The average age patients develop kidney cancer is 50 years old, but one patient was found to have kidney cancer at the age of 20.

Kidney tumours are usually either chromophobe, or a mixture of chromophobe and oncocytic histology, but other types (clear cell and papillary) have been reported. Very few patients with BHD develop metastatic cancer.

More than 80% (4 in 5) of patients have lung cysts, most of which are in the bottom half of the lungs (the basal area). Lung function is usually unaffected.

Roughly a quarter (24%) of BHD patients develop a pneumothorax. The average age of onset is 38 years, but one BHD patient was reported to have their first pneumothorax at the age of 7. Patients may have just one, or multiple pneumothoraces.

Numerous other symptoms have been reported in BHD patients, but most are thought to be coincidental. In particular, links between colorectal adenoma and cancer have been investigated, but so far results are inconclusive.

Diagnosis

To be diagnosed with BHD, you have to have one of the following:

- At least five fibrofolliculomas or trichodiscomas, at least one histologically confirmed;
- A disease causing mutation in the *Folliculin* gene.

Or two of the following:

- Multiple lung cysts mainly in the lower half of both lungs, with no obvious cause, with or without spontaneous pneumothorax;
- Early onset, multifocal or bilateral kidney cancer, or kidney cancer of mixed chromophobe and oncocytic histology;
- A first-degree relative with BHD.

Symptoms can vary from person to person. However, genetic testing can diagnose BHD even before symptoms develop, and is the gold standard for diagnosing BHD. In most cases, genetic testing will not be performed until the age of 16-18 years.

Management of symptoms

Although BHD skin lesions are not cancerous, they can cause patients to feel anxious or self-conscious. There are several cosmetic treatments available which have been reported to work for BHD patients – laser treatment, cautery, and combined curettage and hyfrecation. However, these treatments are usually not a cure, and skin lesions will probably grow back over time.

Screening for renal cancer should start at the age of 20. Where possible, annual MRI scans is the best method. If MRI is not available, then CT or ultrasound scanning can be used instead. A “3 cm rule” where tumours are only surgically removed once they reach 3 cm in diameter might be appropriate to manage BHD kidney tumours.

There is no evidence to suggest that BHD patients should avoid air travel, but patients with a history of recurrent episodes of pneumothorax should see a pulmonary specialist for advice. Patients should have a thoracic CT scan to assess the extent of lung involvement before they have any surgery requiring a general anaesthetic. Treatment is similar for sporadic primary pneumothorax as for pneumothoraces caused by BHD.

Smoking can cause both pneumothorax and kidney cancer, independently of BHD, so should be strongly discouraged in BHD patients.