Results of a National Audit of Screening Advice given to Adults with PTEN Hamartoma Syndrome

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We report the results of a national audit of screening advice given to adult patients in the United Kingdom with PTEN Hamartoma syndrome, a variably penetrant cancer predisposition syndrome with clinical features including macrocephaly and mucocutaneous signs. Screening guidance was proposed by the Pan Thames Cancer Genetics Group in November 2014 and reviewed at the Spring Cancer Genetics Group meeting 2015. The audit/baseline survey aimed to establish a baseline for practice in the UK with a view to completing the audit loop in five years time.

Patients were included in the audit if they had a PTEN mutation or likely pathogenic variant or were at 50% risk, were 16 years or older at time last advice given, with most recent advice given between August 1st 2010 and August 1st 2015.

A total of 175 patients were included in the survey.

Table 1. Number of patients diagnosed with cancer

		Thyroid	Thyroid	Thyroid Function		Colorectal	Skin	Lhermitte-	
Diagnosis	Breast Cancer				Renal				Endometrial

Was the patient the patient t	he proband (first Was the patient male or sed in family)?	Age at date of most recent advice	Affected	19/99	Cancer 21/175	Nodules 94/175	Abnormality 20/175	5/175	Cancer 2/175	Cancer 7/175	Duclos 20/175	7/99
No	Male	40 35 30 25 30 25		Age mean 46.21 Range 25 -71	, _, .	5 1/ 27 5		0, 270	_, _, .	,, _, 0	20,270	.,
81 46%	Yes Female 99	¹⁰	Affected prior to PTEN diagnosis	16	14	38	14	1	2	7	16	-
	54% 57%	5 0 15-24 25-34 35-44 45-54 55-64 65-74	Detected on screening	2	6	54	3	3	0	0	3	-
		Age	Detected between screening	1	1	2	3	1	0	0	1	-
Cancer risk	Risk data	Screening advice	Referred	Fro	From age		Frequency		Advice			
Breast	Cancer – lifetime up to 85% Average age at diagnosis 38- 46 High incidence of fibrocystic	<i>BRCA</i> -equivalent (annual MRI from age 30, mammography from 40)	FOR MRI SCREENING 51 December 28 December 28 December 20 20 December 20 December 20 Not applicable	30 25 20 20 15 10 5 0 20 20	0 23 25 27 30 32	34 35 39 40 41 4 Age	3 44 45 48 60	5 1 10% 2% 45 88%	 Annual Not specified Other frequency 	33%	 Advirefe serv Advirefe serv Advirefe serv Advirefe serv Advirefe serv Co-coserv 	ice given and initial rrals made by Genetics rice ice only. Not anised/referred by retics service ordinated by genetics rice
	breast disease		FOR MAMMOGRAPHY SCREENIN 59 December 24 De	G 16 14 12 10 10 8 0 4 2 0 18	23 25 30 35 36 38 40	41 43 44 45 49 50 51 Age	53 55 59 60 68 72	5 8% 50 85%	 Annual Not specified Other frequence 	ч су	 Adv refa ser Adv org Gen Gen Gen Ser 	vice given and initial errals made by Genetics vice vice only. Not ganised/referred by netics service ordinated by genetics vice
ThyroidCancer – life(usually follpapillary, neMedian ageUp to 75% r	Cancer – lifetime 35% (usually follicular, rarely papillary, never medullary) Median age at diagnosis 37 Up to 75% risk of	As a minimum screen from 16 by USS and TFT. Younger as guided by family history or after informed discussion with family.	FOR THYROID USS SCREENING 119 John John John John John John John John	5 25 20 20 15 15 10 0 0 0 0 0 0 0 0 0	5 ⁹ 10 ¹⁴ 15 ¹⁹ 20 ¹⁴ 25 ¹⁹ 2	0.3 ^A 35-3 ⁹ 40-A ^A 45-A ⁹ 50-5 ⁰ Age	1 15 15 15 10 10 10 10 10 10	93 71 6%1% 93 78%	 Annual Not specified One off Other frequence 	14 12% 28 23%	 Advic refer servic Advic orgar Gene Co-or servic 	ce given and initial rals made by Genetics ce ce only. Not nised/referred by etics service rdinated by genetics ce
multinodular goitre, adenomatous nodules & follicular adenomas		Ideally through adult oncology clinic or paediatric endocrinology	FOR THYROID FUNCTION TESTS 60 ANA ANA ANA ANA ANA ANA ANA ANA ANA AN	12	A 10-7A 15-79 20-2A 25	-29 30-34 35-39 40-44 Age	45-49 50-54 55-60	1 32% 5% 18 0% 38 63%	 Annual Not specified One off Other frequent 	cy	 Adv refe ser Adv org Gen Gen Gen Ser 	vice given and initial errals made by Genetics vice vice only. Not anised/referred by netics service -ordinated by genetics vice
Renal	Cancer – lifetime up to 35% (mostly papillary) Risk starts late 40s	Consider annual urine dip for haematuria from 40	URINE DIP 32 Jointon 32 Jointon 33 Jointon 34 Jointon 35 Jointon 36 Jointon 37 Jointon 38 Jointon 39 Jointon 30 Join	8	* 15-29 20-24 25-29 30-2	A 35-39 40-44 45-49 55 Age	2.5 ^A 55-5 ⁹ 60-6 ^A	24 75%	 Annual Not specified One off Other frequer 	7 22% 12 37%	 Advice reference service 13 41% Advice organisation organisation organisation Co-on service 	ce given and initial rals made by Genetics ce ce only. Not nised/referred by etics service rdinated by genetics ce
		Consider annual renal ultrasound from 40 (London group agreed no screening)	FOR RENAL ULTRASOUND SCA 45 Anno Anno 118 Anno 12 Anno No Not applicable	N 15 -	15- ¹⁹ 20-2 ⁴ 25-2 ⁹ 30-3 ⁴ 35	5-39 AO-AA A5-A9 50-54 55 Age	,5 ⁹ 60.6 ⁴ 65.6 ⁹	4 9% 18% 33 73%	 Annual Not specified Other frequent 	15 33%	9 20% Adv orga Gen 21 .7%	ice given and initial errals made by Genetics vice ice only. Not anised/referred by netics service ordinated by genetics vice
Colorectal	Cancer – lifetime up to 9% Risk starts late 30s More than 90% have polyps, which may be symptomatic	Ascertainment colonoscopy at age 35 and 55 Polyp f/u as required	COLONOSCOPY 97 Anna Anna Anna Anna Anna Yes 64 Anna Anna Anna No 14 Anna Anna Anna Anna Anna Anna Anna Ann	30 25 20 20 15 15 10 5 0 0 38-2	2 23-21 28-32 33-31	38- ^{A2} A3- ^{A1} A8- ⁵² 55 Age	44 45%	7 7% 18 19% 28 29%	 Annual Not specified One off Other frequence 	8 8% 49 51%	40 40 41% Advii orga Gene Co-o servi	ce given and initial rrals made by Genetics ice ce only. Not nised/referred by etics service ordinated by genetics ice
Skin & vascular system	Melanoma – ~5% Many non-malignant lesions	Baseline dermatological review & appropriate f/u	DERMATOLOGY REVIEW 60 Ares 113 Area Area Area No 2 Area Not applicable	14 12 10 8 6 6 0 4 2 0 0	¹⁷ 18-22 23-2 ¹ 28-32	33- ³¹ 38- ^{Д2} д3- ^{Д1} дя Age	1 18 3-52 53-57 58-62	6 10% 34 9 15% 34	 Annual Not specified One off Other frequent 	19 32% cy 14 23%	 Advir referservit 27 45% Advir orga Gene Co-o servit 	ce given and initial rrals made by Genetics ice ce only. Not nised/referred by etics service ordinated by genetics ice
Brain	Lhermitte-Duclos disease – up to 32%	Symptom enquiry Brain MRI only if symptomatic	SYMPTOM ENQUIRY 25 And Andrew	7-12 7 7 7 7 7 7 7 7 7	-1 22-26 21-31 3	2- ³⁶ 31- ^{A1} A2- ^{A6} Age	A1-52 51-62	3 12% 7 28% 15 60%	 Annual Not specified Other frequent 	10 40%	4 .6% Advi Gen Advi orga Gen 11 44% Co-co serv	ice given and initial rrals made by etics service ice only. Not anised/referred by etics service ordinated by genetics ice
Endometrial	Cancer – lifetime up to 28% Risk starts late 30s – early 40s Benign uterine fibroids very common.	 Refer to specialist Gynaecologist age 35-40 for discussion of screening options and management of non-cancer manifestations Consider risk-reducing hysterectomy 	DISCUSS HYSTERECTOMY WITH GYNAE 22 Definition 22 Definition 22 Definition 22 Definition 23 Definition 24 Definition 25 Definition 26 Definition 27 Definition 28 Definition 29 Definition 20	COLOGIST CON CON CON CON CON CON CON CON CON CON	clusions creening a reast and ew patien tes of 6.6 urther evi	advice ar thyroid nts had r 57% (3/4 dence is	nd referral is screening. enal or Lher 5) and 12% required.	s variable mitte-D (3/25) re	e. Most p uclos scre espective	atients v eening bu ly are int	vere refe ut the de eresting	erred for etection g.