S2 Table. Characteristics of patients with pathogenic or likely pathogenic variants in moderate-risk genes beyond *BRCA* (n=28)

Case	Sex	Age at first diagnosis of breast cancer	Site	Path	Subtype	Family history Kind (degree*n)	Second cancer	Affected genes	Nucleotide change	Amino acid change	effect	Mode of inheritance	Zygosity	dbSNP
P050	F	39	Rt	IDC	TNBC	Cervix (1*1), stomach (1*1)	-	*ATM*	c.2677C>T	p.Gln893Ter	NS	AD/AR	Hetero	-
P053	F	35	Rt	IDC	ER+/HER2–	Panc (2*1)	-	*ATM*	c.3154-2A>C	-	Splicing	AD/AR	Hetero	-
P064	F	71	Rt	IDC	ER+/HER2–	Breast (1*1,bil)	-	*ATM*	c.5288_5289insGA	p.Tyr1763Ter	NS	AD/AR	Hetero	-
P055	F	49	Bil(syn)	IDC	ER+/HER2–	None	-	*ATM*	c.6002T>G	p.Leu2001Ter	NS	AD/AR	Hetero	-
P009	F	48	Rt	IDC	ER+/HER2–	Breast (1*1), pros (1*1)	-	*ATM*	c.6004C>T	p.Gln2002Ter	NS	AD/AR	Hetero	rs201136510
P072	F	38	Rt	IDC	ER+/HER2–	none	-	*ATM*	c.6985_6988del	p.Ser2329Ter	NS	AD/AR	Hetero	-
P020	F	63	Bil(met)	IDC	ER+/HER2–	Stomach (1*2), lung (1*1)	-	*ATM*	c.7044_7047delGTGC	p.Cys2349Ter	NS	AD/AR	Hetero	-
P029	F	48	Bil(met)	DCIS	ER+/HER2–	Liver (1*1, 2*1)	-	*ATM*	c.8977C>T	p.Arg2993Ter	NS	AD/AR	Hetero	rs770641163
P065	F	56	Rt	IDC	ER+/HER2–	Breast (1*1,2*1), stomach (2*1), bladder (1*1)	-	*ATM*	Exon 62-63 deletion	-	exon deletion	AD/AR	Hetero	-
P035	F	50	Lt	IDC	ER+/HER2–	Larynx (1*1)	Colon	*ATM*	Exon 48 deletion	-	exon deletion	AD/AR	Hetero	-
P024	F	47	Lt	IDC	ER+/HER2–	Breast (1*2)	-	*BARD1*	c.1345C>T	p.Gln449Ter	NS	AD	Hetero	-
P051	F	54	Lt	IDC	ER+/HER2–	Breast (1*1)	-	*BRIP1*	c.1794+1G>A		Splicing	AD/AR	Hetero	rs766516963
P067	F	39	Bil(syn)	IDC	ER+/HER2–	GB (1*1)	--	*BRIP1*	c.189G>A	p.Trp63Ter	NS	AD/AR	Hetero	-
P038	F	50	Lt	DCIS	Unknown	Breast (1*2), ovary (1*1), stomach (1*2,2*2), kidney (1*1), pros (1*1), lung (1*1)	-	*BRIP1*	c.246dupT	p.Tyr822Leufs	FS	AD/AR	Hetero	-
P031	F	50	Rt	IDC	Unknown	Breast (1*1)	Thyroid, cervix	*BRIP1*	c.3072del	p.Ser1025Hisfs	FS	AD/AR	Hetero	-
P028	F	75	Lt	IDC	TNBC	Breast (1*1). stomach (1*1,3*1),	Colon	*BRIP1*	c.3072delG	p.Ser1025Hisfs	FS	AD/AR	Hetero	-

						CRC (1*1), thyroid (1*1)								
P039	F	52	Lt	ILC	ER+/HER2–	Ovary (1*1)	-	*BRIP1*	Exon 7 deletion	-	exon deletion	AD/AR	Hetero	-
P037	F	39	Lt	DCIS	ER-/HER2+	Uterus (1*1), stomach (1*1), liver (1*1)	-	*BRIP1*	Exon 5-6deletion	-	exon deletion	AD/AR	Hetero	-
P073	F	45	Lt	IDC	ER+/HER2–	Breast (1*1,2*1), CRC (1*2)	Thyroid, GB	*CHEK2*	c.417C>A	p.Tyr139Ter	NS	AD	Hetero	-
P033	F	32	Rt	IDC	ER+/HER2–	None	-	*CHEK2*	c.908+2delT	-	Splicing	AD	Hetero	-
P060	F	35	Rt	DCIS	ER-/HER2+	Lung (2*1)	-	*NF1*	c.2041C>T	p.Arg681Ter	NS	AD	Hetero	rs768638173
P071	F	38	Lt	IDC	ER+/HER2–	Thyroid (1*1,2*2)	Thyroid	*RAD51D*	c.270_271dupTA	p.Lys91Ilefs	FS	AD	Hetero	rs753862052
P052	F	37	Rt	IDC	TNBC	None	-	*RAD51D*	c.270_271dupTA	p.Lys91Ilefs	FS	AD	Hetero	rs753862052
P054	F	38	Lt	IDC	TNBC	Breast (3*1), thyroid (2*1)	-	*RAD51D*	c.270_271dupTA	p.Lys91Ilefs	FS	AD	Hetero	rs753862052
P069	F	41	Lt	IDC	TNBC	Breast (2*1)	-	*RAD51D*	c.898C>T	p.Arg300Ter	NS	AD	Hetero	rs750621215
P016	F	41	Bil(syn)	IDC	ER+/HER2–	None	-	*RAD51D*	c.904-2A>T	-	Splicing	AD	Hetero	-
P017	F	51	Lt	DCIS	ER–/HER2+	Kidney (1*1)	Thyroid	*RAD51D*	c.904-2A>T	-	Splicing	AD	Hetero	-
P046	F	37	Lt	IDC	ER–/HER2+	CRC (1*1)	-	*RAD51D*	c.904-2A>T	-	Splicing	AD	Hetero	-

AD, autosomal dominant; AR, autosomal recessive; Bil(met), bilateral breast cancer, metachronous; Bil(syn), bilateral breast cancer, synchronous; CRC, colorectal cancer; dbSNP, Single Nucleotide Polymorphism Database; DCIS, ductal carcinoma in situ; ER, estrogen receptor; F, female; FS, frameshift; GB, gallbladder; HER2, human epidermal growth factor receptor 2; IDC, invasive ductal carcinoma; ILC, invasive lobular carcinoma; LCIS, lobular carcinoma in situ; Lt, left; M, male; MS, missense; NS, nonsense; Rt, right; Panc, pancreas; TNBC, triple negative breast cancer.