



**Supplementary figure 1:** Pie charts represent the percentages of the mutation status among the both cohorts. If any abnormality of Chromosome 9 or 17, or any mutation of *FGFR3* or *TP53* were detected the sample was considered as mutated. In contrast, there are cases with none of the previous mutation identified. A significantly lower percentage of early-onset cases showed any of the typical mutations ( $p < 0.0001$ ).

**Supplementary table 1.** *FGFR3* mutations and different age categories of the early-onset tumours

Age categories	Early-onset group						Consecutive group
	≤20	21 - 25	26 - 30	31 - 35	36 - 40	41 - 45	48 - 87
<b>Number of cases</b>	3	4	8	23	32	48	113
<b>Grade/stage distribution</b>							
Inverted/ Urothelial papilloma & PUNLMP & pTa low-grade	2 (66.7)	4 (100.0)	3 (42.9)	14 (60.9)	19 (59.4)	21 (44.7)	73 (64.6)
pTa high-grade & pT1	1 (33.3)	0	4 (57.1)	5 (21.7)	8 (25.0)	18 (38.3)	33 (29.2)
≥ pT2	0	0	0	4 (17.4)	5 (15.6)	8 (17.0)	7 (6.2)
Not available	0	0	1	0	0	1	0
<b><i>FGFR3</i> gene</b>							
Wild type	2 (66.7)	3 (75.0)	7 (87.5)	15 (71.4)	23 (71.9)	24 (53.3)	41 (36.3)
Mutation	1 (33.3)	1 (25.0)	1 (12.5)	6 (28.6)	9 (28.1)	21 (46.7)	72 (63.7)
Not available	0	0	0	2	0	3	0

PUNLMP, papillary urothelial neoplasm of low malignant potential;