Supplementary Table 7: Details of included studies: immune checkpoint inhibitors

Study (year) - **Design**	**Population (*n*)**	**Prior therapy**	**ICI therapy (*n*)**	**Mean duration of follow-up in months (range)**	**Outcome**			**Adverse events (*n*)**
					Radiological response (*n*)	**Biochemical response (*n*)**	**Progression-free survival**	
Burman (2022) - Cohort	APT (2) - corticotroph (2) PC (4) - corticotroph (3) - silent lactotroph (1)	TSS, RT, TMZ, TMZ + pasireotide (1) n.r. (1) TSS 3x, RT 3x, TMZ, pasireotide, cabergoline, hydroxyurea (1) Cabergoline, TSS 3x, RT, pasireotide (1) n.r. (2)	Anti-PD1 (2) Dual (4)	Treatment duration 2.5 (2-3) Treatment duration 7.3 (3-14)	APT: PD$^{\lozenge}$ 100% (2) PC: PD$^{\lozenge}$ 100% (4), of which 1 first achieved PR$^{\lozenge}$ for 8 months	-	-	Asthenia, anorexia, progressive weight loss (1) Grade 3-4 diarrhea, grade 1 nausea and vomiting (1) n.r. in 3
Ilie (2022) - Retrospective cohort	APT (9) - corticotroph (5) - lactotroph (4) PC (6) - corticotroph (4) - lactotroph (2)	Surgery 15/15 (100%) RT 15/15 (100%) TMZ 15/15 (100%) Cabergoline 10/15 (67%) Bilateral ADX 5/15 (33%) Pasireotide 8/15 (53%) Bevacizumab 3/15 (20%) Metastasis surgery 2/15 (13%) Hydroxyurea 1/15 (7%) Quinagolide 1/15 (7%) Sunitinib 1/15 (7%) Everolimus 1/15 (7%) RFA metastasis 1/15 (7%)	Ipilimumab (5) Ipilimumab + nivolumab (10) NB 6 patients received concurrent cabergoline, 3 patients concurrent prednisone, 1 patient concurrent mitotane and RFA of liver metastases	12.9 (5-32)	APT: SD* 22% (2) PD* 78% (7) PC: PR* 67% (4) PD* 33% (2)	APT: PR$^{\circ}$ 11% (1) PD$^{\circ}$ 56% (5) n.a. 33% (3) PC: CR$^{\circ}$ 33% (2) PR$^{\circ}$ 17% (1) PD$^{\circ}$ 17% (1) n.a. 33% (2)	-	Grade 1 pruritis (1) Grade 2 pruritis (1) Grade 1 asthenia (3) Grade 3 asthenia (1) Grade 1 constipation (1) Grade 3-4 diarrhea (1) Grade 1 nausea and vomiting (1) Grade 2 colitis (1) Anorexia and weight loss (1) Grade 2 hypersensitivity pneumonitis (1) Grade 1 itchy scalp lesion (1) Grade 2 rash (1) Primary sclerosing cholangitis (1) Grade 1 hepatotoxicity (1)
Majd (2020) - Trial	PC (4) - corticotroph (3, of which 1 silent) - lactotroph (1)	Surgery 4/4 (100%) RT 4/4 (100%) Bilateral ADX 2/4 (50%) TMZ 4/4 (100%) CAPTEM 4/4 (100%)	Anti-PD1 (4)	Treatment duration 13.3 (6-29)	PR$^{\square}$ 2 (50%) SD$^{\square}$ 1 (25%) PD$^{\square}$ 1 (25%)	CR 1 (25%) PR 1 (25%) PD 1 (25%) n.a. 1 (25%)	Mean 15.5 months (range 4-48) after 1st pembrolizumab dose	Grade 2 fever (1) Grade 1 fatigue (3) Grade 2 fatigue (1) Grade 1 maculopapular rash (1) Grade 1 anorexia (1)

		Bevacizumab 2/4 (50%) FGFR inhibitor 1/4 (25%) Lomustine 1/4 (25%) IDO1 pathway inhibitor 1/4 (25%) CDK pathway inhibitor 1/4 (25%) Cisplatin + etoposide 1/4 (25%) Bevacizumab + temsirolimus + valproic acid 1/4 (25%) PRRT 1/4 (25%)						Garde 1 myalgia (1) Grade 1 nausea (1)

ICI = immune checkpoint inhibition
APT = aggressive pituitary tumour
PC = pituitary carcinoma
RT = radiotherapy
TMZ = temozolomide
CAPTEM = capecitabine + temozolomide
PD1 = programmed cell death protein 1
ADX = adrenalectomy
RFA = radiofrequency ablation
FGFR = fibroblast growth factor receptor
IDO1 = indoleamine 2,3-dioxygenase-1
CDK = cyclin-dependent kinase
PRRT = peptide receptor radionuclide therapy

n.r. = not reported
n.a. = not assessed

◊ According to the following criteria:
CR = complete response: disappearance of all lesions
PR = partial response: ≥ 30% reduction in tumour volume
SD = stable disease: change in tumour volume between ≤ 30% decrease and ≤ 10% increase from baseline
PD = progressive disease: ≥ 10% increase in tumour volume

* According to RECIST criteria:
CR = complete response: disappearance of all lesions
PR = partial response: ≥ 30% reduction in tumour volume
SD = stable disease: change in tumour volume between 20% decrease and 10% increase from baseline
PD = progressive disease: ≥ 20% increase in tumour volume (or new metastases)

° According to the following criteria:
CR = complete response: normalization of hormone levels
PR = partial response: ≥ 20% reduction in hormone levels
SD = stable disease: < 20% change in hormone levels
PD = progressive disease: ≥ 20% increase in hormone levels

□ According to the following criteria:
CR = Disappearance of all lesions in two consecutive observations not less than 4 wk apart
PR = ≥50% decrease in tumor burden compared with baseline in two observations at least 4 wk apart
SD = 50% decrease in tumor burden compared with baseline cannot be established nor 25% increase compared with nadir
PD = At least 25% increase in tumor burden compared with nadir (at any single time point) in two consecutive observations at least 4 wk apart