

Table SI. Published case reports.

Patient no.	Sex	Age, years	Cancer type	Immunotherapy	Doses received	CTCAE grading	Concomitant disease	liver	Concomitant irAEs	Liver biopsy	Liver biopsy findings	Treatment	Disease resolution (time to resolution)	(Refs.)
1	M	50	HNSCC	Nivolumab	13	3	Hepatitis B, metastases	liver	Skin rash, hypophysitis	Yes	Lymphocyte infiltration to Glisson's capsule, piecemeal necrosis	mPSL, MMF	Yes (3 months)	(1)
2	M	73	Melanoma	Pembrolizumab	7	4	No		Retinopathy	Yes	Lobular and portal hepatitis, predominant CD8 ⁺ lymphocytic infiltrate, mild steatosis	mPSL, MMF, TAC	Yes (12 months)	(2)
3	M	70	Melanoma	Ipilimumab	3	4	No		Hypophysitis	No		mPSL, MMF, TAC	Yes (10 months)	(3)
4	M	45	NSCLC	Pembrolizumab	2	2	No		None	Yes	Lobular hepatitis, spotty-focal necrosis, piecemeal necrosis, predominant CD4 ⁺ lymphocytic infiltrates, CD8 ⁺ T cell infiltrates	PSL	Yes (4 months)	(4)
5	M	86	Gastric cancer	Pembrolizumab	5	3	No		Pneumonitis	No		mPSL	Yes (3 months)	(5)
6	M	58	NSCLC	Toripalimab	1	4	No		None	Yes	Lobular spotty cholestasis	mPSL, Tofacitinib, IVIG, PE	Yes (1 month)	(6)
7	M	61	HCC	Nivolumab	2	3	Alcoholic cirrhosis	liver	Verrucous lichen planus	No		PSL	Yes (5 months)	(7)
8	M	51	NSCLC	Nivolumab	6	4	No		Thyroiditis, adrenal insufficiency, skin rash	Yes	Lobular and portal hepatitis, lymphocyte infiltration, cholestasis	mPSL, MMF	Yes (2 months)	(8)
9	F	51	TNBC	Pembrolizumab	1	4	No		Myocarditis	No		mPSL	Yes (2 months)	(9)
10	F	67	Melanoma	Ipilimumab/nivolumab	4/4	3	No		None	Yes	Panlobular focal histiocytic aggregates, lymphocyte infiltration	mPSL, MMF	Yes (N/A)	(10)
11	M	78	Melanoma	Pembrolizumab	48	4	No		None	Yes	Lobular interlobular bile duct inflammation,	mPSL	Yes (1,5 months)	(11)

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27	M	67	NSCLC	Pembrolizumab	1	4	No	None	Yes	(vanishing bile duct syndrome) Lymphocytic infiltration	mPSL, UDCA	Yes (2 months)	(25)
28	M	72	HCC, HNSCC	Ipilimumab/nivolumab	1/1	4	No	None	No		PSL	Yes (3 months)	(26)
29	M	59	NSCLC	Nivolumab	3	3	Hepatitis B	Pneumonitis	No		mPSL	Yes (1,5 months)	(27)
30	F	65	NSCLC	Pembrolizumab	4	3	No	None	Yes	Predominant and lymphocytic infiltrates	CD8 ⁺ CD3 ⁺ PSL, AZP	Yes (7 months)	(28)
31	M	45	Melanoma	Ipilimumab	4	3	No	None	Yes	Lobular focal cholestasis, lymphocytic infiltration	hepatitis, necrosis, PSL	Yes (8 days)	(29)
32	F	47	Ovarian cancer	Nivolumab	6	3	No	None	No		mPSL	Yes (1,5 months)	(30)
33	F	75	Urothelial carcinoma	Pembrolizumab	1	3	No	Myasthenia gravis-like disorder, ocular myositis	No		mPSL	Yes (7 days)	(31)
34	F	59	Melanoma	Ipilimumab/nivolumab	3/3	3	No	Uveitis, thyroiditis diabetes type I, vitiligo	No		PSL, MMF	Yes (1,5 months)	(32)
35	M	74	NSCLC	Durvalumab	2	3	No	Pneumonitis	Yes	Lobular and portal hepatitis, CD8 ⁺ T cells infiltration	PSL, MMF, UDCA	Yes (3,5 months)	(33)
36	M	46	NSCLC	Pembrolizumab	1	3	No	Pneumonitis	Yes	Panlobular and necrosis, CD8 ⁺ T cells infiltration	hepatitis, CD8 ⁺ T PSL, MMF, UDCA	Yes (3,5 months)	(33)
37	M	65	Esophageal cancer	Camrelizumab	2	3	No	Pneumonitis	Yes	Panlobular cholestasis	hepatitis, mPSL, UDCA, DPMAS MMF, PE,	No	(34)
38	M	64	NSCLC	Nivolumab	11	3	No	Diabetes type I, sclerosing cholangitis-like	Yes	Lobular necrosis, predominant lymphocytic infiltrations	hepatitis, CD8 ⁺ PSL, MMF	No	(35)
39	F	50	Melanoma	Ipilimumab	N/A	4	No	None	No		mPSL, ATG, MMF	Yes (14 days)	(36)
40	F	53	HCC/CCA	Pembrolizumab	8	3	No	Colitis	Yes	Lobular and inflammation, predominantly lymphocytic infiltration (and neutrophils, eosinophils and	portal PSL, MMF	Yes (4 months)	(37)

										macrophages), fibrosis			
41	M	46	Melanoma	Nivolumab	1	4	Liver metastases	None	No		mPSL, MMF	No	(38)
42	M	47	Melanoma	Ipilimumab/nivolumab	4/4	4	No	None	Yes	Lobular and portal inflammation, necrosis, predominantly infiltrating lymphocytes and histiocytes	mPSL, MMF	No	(39)
43	M	59	NSCLC	Nivolumab	2	4	Liver metastases	None	No		mPSL, NAC	No	(40)
44	M	42	Melanoma	Nivolumab	17	4	No	None	Yes	Lobular and portal inflammation, necrosis, lymphocytic and eosinophilic infiltration	mPSL, UDCA	Yes months)	(2,5 (41)
45	M	60	HCC	Pembrolizumab	1	4	No	Skin rash	No		PSL, PE	No	(42)
46	M	59	Melanoma	Nivolumab, Ipilimumab	11,2	4	No	Interstitial nephritis	No		mPSL, MMF, PSL	Yes months)	(3 (43)
47	F	49	Melanoma	Pembrolizumab	1	4	MAFLD	None	Yes	Vanishing bile duct syndrome, steatosis, steatohepatitis	PSL, UDCA, MMF	Yes months)	(2 (44)
48	F (CR)	59	Melanoma	Nivolumab	3	3	No	None	Yes	Duct atypia and periductal fibrosis, periportal inflammation, necrosis	PSL, UDCA	Yes months)	(7 (44)
49	M	76	Mesothelioma	Pembrolizumab	1	3	No	None	Yes	Duct injury, cholestasis, periportal inflammation	mPSL, PSL, MMF, UDCA	No	(44)
50	F	57	Melanoma	Pembrolizumab	9	4	No	None	Yes	Portal inflammation, necrosis, CD4 ⁺ and CD8 ⁺ lymphocytes	mPSL, DEX, PSL, MMF, ATG	Yes months)	(5,5 (45)
51	M	69	NSCLC	Durvalumab	1	3	No	None	No		mPSL, MMF, AZP, TAC, Infliximab	Yes months)	(4,5 (46)
52	M	75	Melanoma	Ipilimumab/nivolumab	3/3	3	Liver metastases	None	No		mPSL, PSL, MMF, Budesonide	Yes months)	(2 (47)
53	M	70	NSCLC	Pembrolizumab	1	4	No	None	Yes	Focal necrosis, lymphocytic infiltration predominantly CD3 ⁺ and CD8 ⁺ lymphocytes	PSL	Yes (7 days)	(48)

54	M	58	HNSCC	Pembrolizumab	14	4	No	Gastritis	No		mPSL, MMF, TAC	Yes (1month)	(49)
55	F	38	Melanoma	Nivolumab	1	4	No	None	Yes	Portal inflammation and eosinophilic and neutrophil infiltration, oedema, and cholestasis	mPSL, UDCA	MMF, No	(50)
56	F	70	Melanoma	Nivolumab	1	3	No	None	No		mPSL, MMF	Yes (1 month)	(51)
57	M	25	Melanoma	Pembrolizumab, ipilimumab/nivolumab	6, 4/4	4	Liver metastases	None	Yes	Lobular hepatitis inflammatory infiltrate predominantly of lymphocytes and macrophages	mPSL, MMF, TAC	Yes (2 months)	(52)
58	M	58	Melanoma	Ipilimumab, Pembrolizumab	4, 1	4	No	None	Yes	Lobular and portal hepatitis	mPSL, MMF, PSL	Yes (N/A)	(53)
59	M	67	Melanoma	Ipilimumab, pembrolizumab	1, 2	3	No	None	Yes	Portal and interface hepatitis	mPSL, MMF, PSL	Yes (N/A)	(53)
60	F	72	NSCLC	Atezolizumab	3	3	No	None	Yes	Lobular hepatitis, fibrosis, CD3 ⁺ , CD8 ⁺ and CD4 ⁺ lymphocytes	UDCA, PSL	Yes (1,5 months)	(54)
61	F(CR)	77	Melanoma	Ipilimumab, Nivolumab	4, 22	3	No	None	No		mPSL, PSL	Yes (3 months)	(55)
62	M	52	Melanoma	Nivolumab	11	4	Liver metastases	None	No		GCs	Yes (3 days)	(56)
63	M	58	Renal carcinoma cell	Pembrolizumab	1	3	Non-alcoholic steatohepatitis	Dermatitis, myositis, myocarditis, myasthenia gravis-like disorder, thrombocytopenia	No		mPSL, Pyridostigmine	IVIG, Yes (1 month)	(57)
64	M	69	Urothelial carcinoma, NSCLC	Pembrolizumab	1	N/A	No	Myocarditis, myasthenia-like disorder	No		GCs	Yes (N/A)	(58)
65	F	35	Renal carcinoma cell	Ipilimumab/nivolumab	4/4	4	No	None	Yes	Lobular hepatitis, fibrosis	mPSL, Rituximab, Tocilizumab	MMF, Yes (6 months)	(59)
66	M	68	NSCLC	Pembrolizumab	1	3	No	None	No		mPSL	Yes (7 days)	(60)
67	M	65	NSCLC	Pembrolizumab	2	3	No	Pancreatitis	Yes	Centrilobular necrosis and inflammation, predominantly CD8 ⁺ lymphocytes	PSL, AZA	Yes (1 month)	(61)
68	F	51	Gastric cancer	Nivolumab	5	3	No	Diabetes type I	Yes	Lobular inflammation, necrosis	PSL, PE	No	(62)

69	F	75	Melanoma	Ipilimumab/nivolumab	2/2	3	No	Myositis	No		PSL	Yes (< 1 month)	(63)
70	M	36	Melanoma	Ipilimumab/nivolumab	1/1	4	No	Myositis	No		mPSL, PSL	Yes (14 days)	(63)
71	M	62	NSCLC	Camrelizumab	1	3	Liver metastases	Pneumonitis	Yes	Lobular and portal inflammation, focal necrosis, cholestasis	mPSL	Yes (14 days)	(64)
72	F	54	NSCLC	Pembrolizumab	2	2	No	Thyroiditis, myositis, myocarditis, cirrhosis	Yes	Mild chronic inflammation, interface hepatitis, lymphocytic and plasma cell infiltration	mPSL	Yes (N/A)	(65)
73	F	78	TNBC	Pembrolizumab	7	4	No	Colitis	Yes	Panlobular and portal hepatitis, apoptotic hepatocytes, necro-inflammatory foci, lymphocytosis	PSL	Yes (1 month)	(66)
74	M	39	Melanoma	Nivolumab	1	3	Hepatitis B	None	No		mPSL	Yes (1 month)	(67)
75	M	62	HCC, NSCLC	Nivolumab	2	4	Alcoholic liver cirrhosis, Hepatitis C, Liver transplantation	Esophagitis	Yes	Lobular inflammation, necrosis, cholestasis	GCs, TAC	No	(68)
76	M	55	Esophageal cancer	Ipilimumab/nivolumab	1/1	3	No	Hypophysitis	Yes	Lymphocytic infiltration, neutrophil aggregation in small foci	PSL	Yes (3 months)	(69)
77	M	72	Melanoma	Ipilimumab/nivolumab	4/8	4	No	None	No		PSL	Yes (1 month)	(70)
78	M	40	Melanoma	Pembrolizumab	3	2	No	None	Yes	Lobular and portal inflammation, lymphocytic infiltration, necrosis, cholestasis	mPSL, PSL	Yes (1 month)	(71)
79	M	56	Melanoma	Ipilimumab/nivolumab	2/2	4	No	None	Yes	Portal, periportal and lobular inflammation, CD4 ⁺ and CD8 ⁺ T-cell infiltration	DEX, mPSL, MMF	Yes (1,5 month)	(72)
80	F	71	Giant cell bone tumor	Pembrolizumab	28	3	Primary biliary cholangitis	Thyroiditis, NSTEMI	Yes	Eosinophil rich lobular hepatitis, primary biliary cholangitis, septal fibrosis	PSL, UDCA	Yes (7 months)	(73)
81	M	48	NSCLC	Pembrolizumab	2	3	No	None	Yes	Portal inflammation, predominantly CD8 ⁺ lymphocytes	PSL, UDCA	Yes (2 months)	(74)

82	M	47	HCC	Camrelizumab	1	4	Hepatitis B, HBV-related cirrhosis	None	No		UDCA, mPSL, PE	No	(75)
83	M	70	Melanoma	Pembrolizumab	4	4	Liver metastases	Vitiligo, tubulointerstitial nephritis, encephalitis	Yes	Portal tract fibrosis and inflammation, periportal hepatocyte ballooning and focal necrosis, CD4 ⁺ and CD8 ⁺ lymphocyte infiltration	mPSL, MMF	Yes (3 months)	(76)
84	M	73	NSCLC	Nivolumab	10	2	Liver metastases	None	No		PSL	Yes (6 months)	(77)
85	M	68	Glioblastoma	Nivolumab	4	4	No	Colitis	Yes	Lobular inflammation, interface hepatitis, steatosis, predominantly CD8 ⁺ lymphocytes	mPSL	Yes (1 month)	(78)
86	F	70	Melanoma	Pembrolizumab	12	3	No	Skin rash, arthritis, pancreatitis, nephritis	Yes	Lobular and portal inflammation, interface hepatitis, fibrosis, vanishing bile duct syndrome, steatosis, cholestasis,	mPSL, MMF, PE	No	(79)
87	F	74	NSCLC	Camrelizumab	51	4	No	None	No		mPSL	Yes (1 month)	(80)
88	M	78	Urothelial carcinoma	Ipilimumab/nivolumab	3/3	4	No	None	No		PSL, MMF	Yes (3 months)	(81)
89	F	75	NSCLC	Durvalumab	1	3	No	None	Yes	Lobular and portal hepatitis, necrosis, predominantly CD3 ⁺ and CD8 ⁺ lymphocytic infiltration	mPSL	Yes (2 months)	(82)
90	M	79	NSCLC	Pembrolizumab	1	3	No	None	No		PSL	Yes (1 month)	(83)
91	M	74	Gastric cancer	Pembrolizumab	2	1	Liver metastases	Myositis, Myocarditis	No		mPSL	Yes (10 days)	(84)
92	M	63	Melanoma	Ipilimumab	4	4	No	None	Yes	Lobular and portal inflammation, interface hepatitis, eosinophilic infiltration	GCs, TAC	Yes (7,5 months)	(85)
93	F	76	Melanoma	Ipilimumab	3	3	No	Skin rash, adrenal insufficiency, thyroiditis	Yes	Lobular and portal inflammation, necrosis, fibrosis, lymphocytic infiltration	GCs, TAC	Yes (1 month)	(85)
94	M	60	Melanoma	Ipilimumab	3	4	No	Skin rash, pigmented	Yes	Lobular inflammation,	GCs, MMF	Yes (N/A)	(85)

Case No.	Sex	Age	Primary Tumor	Immunotherapy	Time to Onset (months)	Time to Resolution (months)	Systemic Therapy	Associated Conditions	Symptoms	Histopathology	Immunohistochemistry	Response	Duration of Response (months)	Outcome	
95	F	47	Melanoma	Ipilimumab	3	3	No	macule	Gastritis	Yes	predominantly CD8 ⁺ infiltration	Lobular and portal inflammation, eosinophilic infiltration, interface hepatitis, fibrosis	GCs, MMF	Yes (5 months)	(85)
96	M	43	Melanoma	Ipilimumab	3	4	No	Vitiligo, erythema	skin rash,	Yes	Lobular inflammation, predominantly CD8 ⁺ lymphocytes in hepatic lobules, CD3 ⁺ and CD4 ⁺ in periportal areas, necrosis	PSL	Yes (4 months)	(85)	
97	M	74	Renal cell carcinoma	Nivolumab	13	3	No	Thyroiditis, pruritus		No		N/A	No	(86)	
98	F	83	Renal cancer, cancer, cancer	pelvis ureteral bladder Pembrolizumab	1	4	Liver metastases	None		No		PSL, UDCA	Yes (22 days)	(87)	
99	M	50	Renal cell cancer	Nivolumab	36	3	No	Pneumonitis		No		mPSL, MMF	Yes (15 days)	(88)	
100	F	58	Renal cell cancer	Nivolumab	28	3	No	Pneumonitis		No		mPSL, MMF	Yes (2 months)	(88)	
101	M	73	HNSCC	Pembrolizumab	2	2	N/A	Colitis		Yes	Lobular hepatitis, lymphocyte, histiocyte, and eosinophil infiltrates	PSL	Yes (2 months)	(89)	
102	M	58	Renal cell cancer	Ipilimumab/nivolumab	2/4	4	Liver metastases	Diabetes insipidus (neurohypophysitis)		Yes	CD8 ⁺ T cell infiltration	PSL, MMF	No	(90)	
103	M	58	Melanoma	Ipilimumab/nivolumab	4/4	2	MAFLD	Skin rash		Yes	Granulomatous, histiocyte-predominant inflammatory infiltrate, necrosis, steatosis	PSL	Yes (N/A)	(91)	
104	F	31	Melanoma	Ipilimumab/nivolumab	3/3	3	MAFLD	Colitis		Yes	Clusters of histiocytes with fibrin, necrosis, steatosis	mPSL, PSL, MMF	Yes (N/A)	(91)	
105	F	52	Melanoma	Ipilimumab/nivolumab	4/4	3	Liver metastases	Cholangitis, pancreatitis, gastroduodenitis, colitis		Yes	Portal intralobular and granulomatous hepatitis, eosinophil infiltrates	PSL, MMF, UDCA, TAC, Sirolimus	Yes (24 months)	(92)	

106	M	68	Renal cell cancer	Nivolumab	5	2	No	Thyroiditis, myositis, nephritis	vitiligo,	No		DEX, mPSL,	Yes (4 days)	(93)
107	F	52	Melanoma	Pembrolizumab, ipilimumab	8, 2	3	No	None		Yes	Periportal, portal and lobular hepatitis with fibrin ring granulomas, necrosis, steatosis	PSL	Yes (N/A)	(94)
108	M	80	Esophageal cancer	Nivolumab	1	4	No	None		Yes	Predominantly CD3 ⁺ and CD8 ⁺ T cell infiltration	mPSL	No	(95)
109	M	64	HNSCC	Atezolizumab/tiragolumab	5/5	4	No	None		Yes	Panlobular inflammation, necrosis, predominantly mononuclear cell infiltration	GCs, PE, MMF	Yes (20 days)	(96)
110	F	80	Renal cell cancer	Nivolumab	4	4	No	None		Yes	Lobular and portal inflammation, necrosis, neutrophil, lymphocyte (CD3 ⁺ , CD4 ⁺ , CD8 ⁺) and histiocyte infiltrates, steatosis	mPSL, UDCA	No	(97)

CTCAE, Common Terminology Criteria for Adverse Events; F, female; M, male; NSCLC, non-small cell lung cancer; TNBC, triple negative breast cancer; HCC, hepatocellular carcinoma; HNSCC, head and neck squamous cell carcinoma; CCA, cholangiocarcinoma; mPSL, methylprednisolone; PSL, prednisolone; MMF, mycophenolate mofetil; TAC, tacrolimus; PE, plasma exchange; IVIG, intravenous immunoglobulin; UDCA, ursodeoxycholic acid; ACC, acetylcysteine; NAC, N-acetylcysteine; ATG, anti-thymocyte globulin; GCs, glucocorticoids; HCT, hydrocortisone; AZP, azathioprine; DPMAS, double plasma molecular adsorption system; DEX, dexamethasone; NSTEMI, non-ST-elevation myocardial infarction; MAFLD, metabolic-associated fatty liver disease; N/A, not available.

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