**Table S1.** Immune Checkpoint Inhibitors (CPIs) in Patients with Cancer and Prior Solid Organ Transplantation (SOT)a

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Patient ID** **(age, sex)** | **Type of cancer** | **Type of CPI** | **Type of SOT (underlying cause)** | **Time from SOT to CPI, years** | **Immunosuppression at CPI initiation (dose/day)** | **CPI-induced adverse events** | **Tumor response to CPI** | **Mortality (cause of death)** |
| **Patients with renal transplantation** |
| 1 (67, M)b | Melanoma | Ipilimumab | Kidney (PKD) | 19 | Prednisone (5 mg) + cyclosporine (100 mg) | Rejection | PD | Yes (progressive cancer/graft rejection) |
| 2 (40, M)(1) | Melanoma (choroidal) | Ipilimumab | Kidney (Undefined) | 16 | Prednisone (5 mg) | Rejection | PD | Yes (progressive cancer) |
| 3 (63, F)(2) | Melanoma | Nivolumab | Kidney (Type I DM, HTN) | 12 | Prednisone (10 mg) | Rejection | PR | No |
| 4 (48, M)(3) | Melanoma | Nivolumabc | Kidney (IgA nephropathy) | 14 | Prednisone (5 mg) | Rejection | PR | No |
| 5 (60, M)b | Melanoma | Pembrolizumab | Kidney (HTN) | 5 | Prednisone (5 mg) | Rejection | PD | Yes (graft rejection) |
| 6 (58, M)(4) | Melanoma | Pembrolizumab | Kidney (IgM nephropathy) | 13 | Azathioprine (100 mg) + everolimus (1 mg) | Rejection | PD | Yes (progressive cancer/graft rejection) |
| 7 (72, M)b | Melanoma | Pembrolizumab | Kidney (PKD) | 19 | Prednisone (5 mg) + Cyclosporine (175 mg) + MMF (1000 mg)d | Rejection | Not evaluated | No |
| 8 (68, M)(5) | Melanoma | Pembrolizumabc | Kidney (PKD) | 15 | Prednisone (unspecified dose) | Rejection | Undefined | No |
| 9 (72, M)(6) | Cut. SCC | Ipilimumab + nivolumab combination | Kidney (DM) | 4.5 | CPI started after 1 week of immunosuppression (MMF + sirolimus) washout period | Rejection | PR | Yes (rejection complication)e |
| 10 (57, F)(7) | Cut. SCC | Pembrolizumab | Kidney (undefined) | 25 | Prednisone (5 mg) | Rejection | PR | No |
| 11 (74, M)(8) | NSCLC | Nivolumab | Kidney (DM, HTN) | 5 | Prednisone + cyclosporine (unspecified doses) | Rejection | Undefined | No |
| 12 (58, M)(9) | Melanoma | Ipilimumab | Kidney (PKD) | 8 | Prednisone (5 mg) | Colitis | PR | No |
| 13 (79, M)b | Melanoma | Nivolumabc | Kidney (HTN, FSGS) | 4 | Prednisone (2.5 mg) + cyclosporine (200 mg) | Arthralgia, severe constitutional symptoms | PR | No |
| 14 (71, M)b | Melanoma | Pembrolizumab | Kidney (DM) | 2 | Prednisone (5 mg) + sirolimus (3 mg) | Dermatitis, hepatitis, severe constitutional symptoms | PD | Yes (progressive cancer) |
| 15 (66, M)b | Melanoma | Pembrolizumab | Kidney (RCC) | 1.5 | Prednisone (5 mg) + MMF (1000 mg) + tacrolimus (3 mg) | Thyroiditis | PD | Yes (progressive cancer) |
| 16 (69, F)(10) | Cut. SCC | Nivolumab | Kidney (FSGS) | 14 | Prednisone (5 mg) + sirolimus (unspecified) | Dermatitis, pneumonitis | PR | No |
| 17 (72, M)(9) | Melanoma | Ipilimumab | Kidney (HTN) | 11 | Prednisone (5 mg) | None | PR | No |
| 18 (60, F)(11) | Melanoma | Nivolumab | Kidney (PKD) | 13 | Prednisolone + MMF (unspecified doses) | None | PD | Yes (progressive cancer) |
| 19 (77, M)(12) | Melanoma | Nivolumabc | Kidney (DM) | 8 | Prednisone (5 mg) + tacrolimus (4 mg) | None | PD | No |
| 20 (58, M)(11) | Melanoma (Uveal) | Pembrolizumab | Kidney (Hydronephrosis) | 32 | Cyclosporine (unspecified dose) | None | PD | Yes (progressive cancer) |
| 21 (63, M)(13) | Cut. SCC | Pembrolizumab | Kidney (nephrosclerosis) | 13 | Prednisone (2.5 mg) + sirolimus (2 mg) | None | CR | No |
| 22 (61, M)b | Cut. SCC | Pembrolizumab | Kidney (IgA nephropathy) | 4 | Prednisone (5 mg) + Tacrolimus (2 mg)f | None | PR | No |
| 23 (70, M)(14) | Duodenal cancer | Nivolumab | Kidney (RCC) | 6 | Prednisone (40 mg) + sirolimus (unspecified) | None | SD | No |
| **Patients with hepatic transplantation** |
| 24 (67, F)(15) | Melanoma (ocular) | Ipilimumab | Liver (metastasis) | 1.5 | Prednisolone (10 mg) | Rejection | PD | Yes (progressive cancer) |
| 25 (46, F)b | Melanoma | Pembrolizumabg | Liver (medication toxicity) | 5 |  Sirolimus (5 mg) | Rejection | PD | Yes (progressive cancer/graft rejection) |
| 26 (20, M)(16, 17) | HCC  | Nivolumab | Liver | 3.3 | Sirolimus (unspecified dose) | Rejection | Undefined | Yes (graft rejection) |
| 27 (14, M)(16, 17) | HCC  | Nivolumab | Liver | 1.9 | Tacrolimus (unspecified dose) | Rejection | Undefined | Yes (graft rejection) |
| 28 (67, M)(18) | Melanoma | Ipilimumab | Liver (HCV, HCC) | 8 | Sirolimus (1 mg) | Dermatitis, hepatitis | PR | No |
| 29 (35, M)(19)b | Melanoma | Pembrolizumab | Liver (biliary atresia) | 20 | Tacrolimus (2 mg) | Hepatitis | CR | No |
| 30 (59, F)(20) | Melanoma | Ipilimumab | Liver (alpha 1 antitrypsin deficiency cirrhosis) | 8 | Tacrolimus (2 mg) | None | PD | No |
| 31 (41, M)(21) | HCC | Nivolumab | Liver (HCV, HIV, liver cirrhosis, HCC) | 0.92 | Tacrolimus (1 mg) | None | PD | Yes (progressive cancer) |
| 32 (70, M)(22) | HCC | Pembrolizumab | Liver (cryptogenic cirrhosis, HCC) | 8 | Tacrolimus (unspecified dose) | None | PD | Yes (progressive cancer) |
| 33 (62, F)(23) | MPNST-like melanoma | Pembrolizumabc | Liver (alcoholic cirrhosis, HCC) | 6 | MMF (1000 mg) + sirolimus (1 mg) | None | PR | No |
| 34 (54, M)(24) | NSCLC | Nivolumab | Liver (HCV) | 13 | Prednisone (60 mg) + tacrolimus (0.5 mg) + everolimus (2 mg) | None | PD | Yes (progressive cancer) |
| **Patients with cardiac transplantation** |
| 35 (49, M)(25) | Cut. SCC | Nivolumab | Cardiac (familial dilated cardiomyopathy) | 19 | Prednisone + tacrolimus + sirolimus (unspecified doses) | Rejection | Not evaluated | Yes (progressive cancer/graft rejection) |
| 36 (69, F)(26) | Melanoma | Ipilimumab | Cardiac (undefined) | 15 | Tacrolimus (2.5 mg) | None | SD | Yes (progressive cancer) |
| 37 (73, M)b | Melanoma | Pembrolizumab | Cardiac (dilated cardiomyopathy) | 9 | Tacrolimus (6 mg) | None | PD | No |
| 38 (75, M)(27) | Melanoma | Pembrolizumabc | Cardiac (ischemic cardiomyopathy) | 12 | Tacrolimus (6 mg) | None | PD | No |
| 39 (72, F)(10) | NSCLC | Nivolumab | Cardiac (RHD) | 10 | MMF + cyclosporine (unspecified doses) | None | SD | No |
|  |  |  |  |  |  |  |  |  |

aM, male; F, female; HTN, hypertension; PD, progressive disease; PKD, polycystic kidney disease; DM, diabetes mellitus; PR, partial response; NSCLC, non-small cell lung cancer; Cut. SCC, cutaneous squamous cell carcinoma; MMF, mycophenolate mofetil; FSGS, focal segmental glomerulosclerosis; RCC, renal cell carcinoma; SD, stable disease; CR, complete response; HCC, hepatocellular carcinoma; HCV, hepatitis C virus; MPNST, malignant peripheral nerve sheath tumor; HIV, human immunodeficiency virus; RHD, rheumatic heart disease.

bMD Anderson patients (n = 10).

cPrevious use of ipilimumab was reported in these patients, and patient 13 had previously received both ipilimumab and pembrolizumab.

dOne week before the second dose, MMF was discontinued, cyclosporine dose decreased to 150 mg and prednisone dose left unchanged.

eThe patient had CPI-induced graft loss and underwent dialysis. Five months later, the patient experienced sudden cardiac death of unclear etiology during dialysis.

fTacrolimus was being titrated progressively before CPI initiation and was stopped after the first dose.

gPrevious use of interleukin-2 was reported 2 weeks before initiation of pembrolizumab and was stopped because of liver toxicity.

**Table S2.** Quality Appraisal of the Literature Reported Cases.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Lead author (citation)** | **Title** | **Patient demographics** | **Current health status** | **Medical history** | **Physical exam** | **Patient disposition** | **Drug identification** | **Dosage** | **Drug reaction interface** | **Concomitant therapy** | **Adverse events** | **Discussion** |
| Alhamad(5) | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Partially agree |
| Barnett(14) | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree |
| Biondani(24) | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree |
| Boils(8) | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Partially agree | Agree | Agree | Agree | Partially agree |
| De Toni(21) | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Partially agree |
| Dueland(15) | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree |
| Friend(16, 17)b | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree |
|  | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree |
| Gastman(26) | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree |
| Herz(12) | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree |
| Jose(1) | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree |
| Kittai(10) | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Partially agree | Agree | Agree | Agree | Agree |
|  | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Partially agree | Agree | Agree | Agree | Agree |
| Kuo(23) | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree |
| Kwatra(4) | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree |
| Lipson(9) | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Partially agree | Agree | Agree | Agree | Agree |
|  | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Partially agree | Agree | Agree | Agree | Agree |
| Lipson(7) | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Partially agree | Agree | Agree | Agree | Partially agree |
| Miller(6) | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Partially agree | Agree | Agree | Agree | Agree |
| Morales(18) | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree |
| Ong(2) | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree |
| Owonikoko (25) | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Partially agree | Agree | Agree | Agree | Agree |
| Qin(27) | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree |
| Ranganath(20) | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree |
| Sadaat(13) | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree |
| Schvartsman(19) | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Partially agree |
| Spain(3) | Agree | Agree  | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Agree |
| Varkaris(22) | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Partially agree | Agree | Agree | Agree | Agree |
| Winkler(11) | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Partially agree | Agree | Agree | Agree | Agree |
|  | Agree | Agree | Agree | Agree | Agree | Agree | Agree | Partially agree | Agree | Agree | Agree | Agree |

aThe quality of reporting the cases identified from the literature was evaluated by one reviewer (HS) and cross-checked by another (NA) based on the 12 elements required by the International Society for Pharmacoepidemiology and the International Society of Pharmacovigilance for publishing adverse events reports. Possible item ratings are agree, partially, or disagree.

bTwo publications for the same case reports.

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