Author	Demographic	Cancer	Immunotherapy	HLH treatment	HLH outcome	Cancer outcome
Harrist *et al*[7]	83F	Melanoma	Ipilimumab/nivolumab	Steroids	CR	CR
Chin *et al*[20]	58F	Melanoma	Ipilimumab/nivolumab	Steroids	CR	PD
Al-Samkari *et al*[11]	56F	Breast	Pembrolizumab	Steroids	CR	CR
Shah *et al*[21]	76M	Bladder	Pembrolizumab	Steroids+etoposide	CR	Unknown
Seidgar *et al*[22]	36F	Melanoma	Ipilimumab/nivolumab	Steroids+MMF	CR	CR
Okuma *et al*[23]	70M	NSCLC	Pembrolizumab	Steroids	CR	PR

CR, complete response; F, female; HLH, haemophagocytic lymphohistiocytic; HNSCC, head and neck squamous cell carcinoma; M, male; MMF, mycophenolate mofetil; NSCLC, non-small cell lung cancer; PD, progressive disease; PR, partial response; SD, died.

Searching the pharmacovigilance databases found that 92 cases of HLH secondary to nivolumab and 61 cases secondary to ipilimumab had been reported to WHO's Vigibase, while 93 cases secondary to nivolumab and 65 cases secondary to ipilimumab have been reported to the EudraVigilance database.[9 10] It is unclear from these databases whether these immunotherapies were given in combination or if any of them were a rechallenge. A small number of cases of HLH secondary to checkpoint inhibitor therapy have been published in the literature to date and are summarised previously (table 1). All patients received steroids as treatment for HLH, with four patients also receiving etoposide, mycophenolate or plasmapheresis. The majority of patients had a complete response with regard to HLH, which is a strikingly better outcome than those seen in primary HLH.[1] Most patients had at least a partial response to their cancer, with one study, by Kolouk *et al*, describing a patient who was successfully rechallenged with pembrolizumab for head and neck squamous cell carcinoma progression without HLH recurrence.[11] Notably, no patients with HLH secondary to ipilimumab and nivolumab were rechallenged with nivolumab monotherapy, making our case unique.

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Case reports provide a valuable learning resource for the scientific community and can indicate areas of interest for future research. They should not be used in isolation to guide treatment choices or public health policy.

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