Letter to the editor from Pant et al

Shubham Pant,1 Justin T Moyers,1,2 Aung Naing 1

Dear Editor:

In the previously published work ‘Phase 2 study of pembrolizumab in patients with advanced rare cancers’, we published in this journal by Naing et al,1 the checkpoint inhibitor pembrolizumab was evaluated in advanced rare cancers. Herein, we present the extraordinary longer-term result of a patient with primary orbital squamous carcinoma.

Immune checkpoint inhibitors have changed the landscape of cancer therapy. Squamous cell cancer of the orbit is an exceedingly rare tumor with very few cases reported in the literature.2

A man in his early 60s with a history of hypertension, hyperlipidemia, benign prostatic hypertrophy, and gastroesophageal reflux disease presented to his ophthalmologist for blurred vision. Orbital MRI identified a left orbital mass. He was treated with antibiotics and steroids for an infection or inflammation without symptom resolution. He underwent partial transcranial resection on account of tumor proximity to the optic nerve. The pathology showed a poorly differentiated carcinoma with extensive perineural invasion. He then underwent external beam radiation therapy to the tumor site in 58 fractions for a total dose of 6960cGy.

Positron Emission Tomography (PET) scan 3 months post radiation demonstrated a metabolically active left orbital mass, not significantly changed from the PET scan prior to radiation therapy. He then presented to our center for a second opinion. Pathology review confirmed poorly differentiated carcinoma with tumor cells positive for p63 and keratin and negative for TTF1, PSA, and S100. Examination by ophthalmology revealed cranial nerves 3, 4, 5, 6, and 7 palsies, blindness in left eye, and orbital hypertrophy, and gastroesophageal reflux disease presented to his ophthalmologist for blurred vision. Orbital MRI identified a left orbital mass. He was treated with antibiotics and steroids for an infection or inflammation without symptom resolution. He underwent partial transcranial resection on account of tumor proximity to the optic nerve. The pathology showed a poorly differentiated carcinoma with extensive perineural invasion. He then underwent external beam radiation therapy to the tumor site in 58 fractions for a total dose of 6960cGy.

Positron Emission Tomography (PET) scan 3 months post radiation demonstrated a metabolically active left orbital mass, not significantly changed from the PET scan prior to radiation therapy. He then presented to our center for a second opinion. Pathology review confirmed poorly differentiated carcinoma with tumor cells positive for p63 and keratin and negative for TTF1, PSA, and S100. Examination by ophthalmology revealed cranial nerves 3, 4, 5, 6, and 7 palsies, blindness in left eye, and no pupillary response, and no extraocular movement. Restaging PET-CT scans showed left orbital mass without distant metastasis. MRI of the orbit demonstrated infiltrative enhancing lesion involving dorsal aspect of the left orbit with extension along the left optic nerve and along the superior aspect of the orbit into the extraconal space along the superior rectus muscle. The patient was felt not to be a candidate for further surgery or radiation therapy. Chemotherapy with carboplatin and paclitaxel or clinical trial was recommended.

The patient was enrolled onto NCT02721732 with pembrolizumab administered intravenously every 21 days.1

Over the course of treatment, he experienced a decrease in tumor volume with a 73% decrease in tumor. His treatment course was complicated by grade 2 rash. After 2 years of therapy, he was placed on observation and currently remains free of progressive disease 52 months after initiation of therapy.

Primary squamous cell cancer of the orbit is a rare malignancy with no standard of care. Previous case reports have used traditional strategies effective in squamous head and neck cancers including multimodality treatment with surgery, radiation, and/or cytotoxic chemotherapy. Prior reports have used platinum-based chemotherapy in the adjuvant setting along with radiation as well as response to epidermal growth factor receptor targeting agents (erlotinib and cetuximab) in advanced or metastatic cases.3 Pembrolizumab has been approved in squamous carcinomas of the lung, skin,4 and head and neck5 providing rationale for use in rare cancers with squamous histology of any primary site.

Twitter Justin T Moyers @jtmoyers and Aung Naing @AnaingMD

Competing interests SP discloses research support to the institution from Arcus, Arqule, Bristol-Myers Squibb, Eli Lilly, Five Prime Therapeutics, GlaxoSmithKline, Holy Stone Healthcare Co., Tyme, Ipsen, Mirati Therapeutics, Inc., Novartis, OncoResponse, RedHill Biopharma Ltd., Rgenix, Sanofi-Aventis, Xencor, Astellas, and Janssen and reports consultants from Tyme Inc., 4D-Pharma, Xencor, and Ipsen. AN reports research support from NCI, EMD Serono, MedImmune, Healis Oncology Nutrition, Atterocor/
Millendo, Amplimmune, ARMO BioSciences, Karyopharm Therapeutics, Incyte, Novartis, Regeneron, Merck, Bristol Myers Squibb, Pfizer, CytomX Therapeutics, Neon Therapeutics, Calithera Biosciences, TopAlliance Biosciences, Eli Lilly, Kymab, PsiOxus, Arcus Biosciences, NeolImmuneTech, ImmuneOncia, and Surface Oncology, non-financial support for travel and accommodation from ARMO BioSciences, has served as an advisory board member for Novartis, CytomX Therapeutics, Genome & Company, STCube Pharmaceuticals, OncoSec, and Kymab, reports research funding for his spouse from Immune Deficiency Foundation, Jeffery Modell Foundation and Chao Physician-Scientist, and Baxalta, and his spouse has served as an advisory board member for Takeda, CSL, Behring, Horizon, and Pharming outside the submitted work.

**Patient consent for publication** Not applicable.

**Provenance and peer review** Commissioned; internally peer reviewed.

**Open access** This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See http://creativecommons.org/licenses/by-nc/4.0/.

**ORCID iD**
Aung Naing http://orcid.org/0000-0002-4803-8513

**REFERENCES**

1. Naing A, Meric-Bernstam F, Stephen B, et al. Phase 2 study of pembrolizumab in patients with advanced rare cancers. *J Immunother Cancer* 2020;8:e000347.
2. Blandford AD, Bellerive C, Tom M, et al. Case report: primary orbital squamous cell carcinoma. *Ocul Oncol Pathol* 2019;5:60–5.
3. El-Sawy T, Sabichi AL, Myers JN, et al. Epidermal growth factor receptor inhibitors for treatment of orbital squamous cell carcinoma. *Arch Ophthalmol* 2012;130:1608–11.
4. Grob J-J, Gonzalez R, Basset-Seguin N, et al. Pembrolizumab monotherapy for recurrent or metastatic cutaneous squamous cell carcinoma: a single-arm phase II trial (KEYNOTE-629). *J Clin Oncol* 2020;38:2916–25.
5. Burness B, Harrington KJ, Greil R, et al. Pembrolizumab alone or with chemotherapy versus cetuximab with chemotherapy for recurrent or metastatic squamous cell carcinoma of the head and neck (KEYNOTE-048): a randomised, open-label, phase 3 study. *Lancet* 2019;394:1915–28.