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BRIEF COMMUNICATION

Real world outcomes of a virtual ocular oncology service in Scotland

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INTRODUCTION

The COVID-19 pandemic has accelerated the National Health Service (NHS) targets to reduce face-to-face (F2F) appointments [1]. In response, the Scottish Ophthalmic Oncology Service (SOOS) introduced a virtual clinic for the surveillance of ocular oncology patients. Herein, we present real-world outcomes for year one of our virtual SOOS model. In addition, we present outcomes from the first validation audit.

METHODS

Existing follow-up patients within the SOOS were directed into a nurse-led diagnostic hub. Tests included wide-field colour imaging photography, B-scan ultrasound and ultrasound bio-microscopy, and optical coherence tomography OCT. The results were reviewed asynchronously by an SOOS consultant within one week. Suspicious lesions were referred to a weekly multi-disciplinary team (MDT) meeting (supported by ocular oncology, clinical radiology, histopathology, clinical oncology and specialist oncology nurses). Patients who were recalled for F2F review within 3–6 months were audited to verify the appropriateness of the original decision making.

RESULTS

Between September 8th 2020 and August 24th 2021, a total of 950 patients were booked to the SOOS, 678 in the F2F clinic and 272 in the virtual clinic. This was an increase of 190 (25%) bookings, compared to the 12 months prior to the introduction of the virtual clinic. Twenty-one (7.7%) patients were recorded as virtual non-attendances, and were excluded from the final analysis. The most common diagnoses were uveal melanoma (150, 59.7%), indeterminate uveal lesion (44, 17.5%) and uveal naevus (42, 16.7%). The outcomes of the virtual clinic are shown in Table 1. Ten patients (4.4%) were referred to the MDT for possible change in tumour activity (Table 2). Two patients (0.8%) required medical intervention, for the transformation of choroidal naevi to stage I choroidal melanoma (AJCC classification). 18 patients were included in the validation audit. There was 100% concordance between the virtual and the subsequent F2F assessments at 3–6 months.

DISCUSSION

In this study, the feasibility of implementing a virtual ocular oncology service was demonstrated. In the 251 patients reviewed, the majority had a diagnosis of treated uveal melanoma. We furthermore reviewed patients with other intraocular tumours including uveal naevi and indeterminate lesions, and other choroidal and retinal tumours. The majority of patients could be followed up in the virtual clinic, expanding the total capacity of the service.

Various models of care have been investigated for the assessment of melanocytic lesions. The Liverpool Ocular Oncology Centre (LOOC) have successfully established a nurse-led F2F service [2]. Karthikeyan and colleagues reported the virtual surveillance of benign melanocytic lesions, whereby patients underwent multi-modality imaging later reviewed virtually by a trained optometrists [3]. This study compliments previous studies with a larger, mixed-pathology cohort.

The most important aspect considered during the establishment of the virtual clinic was safety, and the risk of missing malignant transformation. Clinical agreement between the virtual and F2F outcomes measured in the validation audit was 100%, supporting the safety profile of the service. This is in keeping with previous work demonstrating strong clinical agreement between virtual reviews by trained ophthalmologists, and traditional clinical assessment [4]. Furthermore, any suspicious lesions were immediately referred to an integrated MDT, ensuring the absence of F2F assessment did not result in untimely delays to patient care. Only 4% of the cohort were deemed to have a suspicious lesion, however a 39% recall rate to the F2F clinic was observed. This was not unexpected; the NAEVUS study estimated a 23-24% rate of 'over-referrals' to F2F clinic in planning a virtual service [5]. One possible explanation for this is a cautious approach by the reviewing clinician, for fear of missing a slow-growing tumour. A combination of virtual assessments and F2F assessments may reduce the risk of missed adverse events [2].

In summary a virtual ocular oncology service can be implemented successfully, to enable services to adapt to changing demands in the post-COVID era.

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Table 1. The outcomes and follow-up intervals for patients attending the virtual ocular oncology service.

Diagnosis	Uveal melanoma	Indeterminate lesion	Uveal naevus	Other	Total
Number of patients	150 (59.8)	44 (17.5)	42 (16.7)	15 (6.0)	251 (100)
Outcome					
Virtual clinic	68 (45.3)	26 (59.1)	21 (50)	7 (46.7)	122 (48.6)
Face-to-face	66 (44.0)	14 (31.8)	13 (21.4)	6 (40.0)	99 (39.4)
Referred to local services	15 (10.0)	4 (9.1)	7 (16.7)	1 (6.7)	27 (10.8)
Discharge	1 (0.7)	0 (0.0)	1 (2.4)	1 (6.7)	3 (1.2)
Follow-up interval					
1-2 months	1 (0.7)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.4)
3–6 months	19 (12.7)	14 (31.2)	5 (11.9)	5 (33.3)	43 (17.1)
7–9 months	29 (19.3)	13 (29.5)	6 (14.3)	2 (13.3)	50 (19.9)
1 year	85 (56.7)	13 (29.5)	23 (54.8)	6 (40)	127 (50.6)

Data presented as number (%).
Other = choroidal haemangioma (6, 2.39%), iris cyst (2, 0.8%), capillary haemangioma (1, 0.4%), vaso-proliferative tumours (1, 0.4%), retinal angioma (1, 0.4%), congenital hypertrophy of the retinal pigment epithelium (1, 0.4%), and peripheral exudative haemorrhagic retinopathy (1, 0.4%).

Table 2. Patients reviewed at MDT meeting for suspected change in tumour activity.

Case	Date of attendance	Sex	Age	Diagnosis	Clinical photography	Ultrasound	OCT	MDT outcome	Assessment at next visit
1	08.09.20	M	86	Indeterminate choroidal lesion	↑	↔	↔	F2F 6 months	Slow growth
2	08.09.20	F	80	Choroidal naevus	↑	↑	↔	F2F 6 months	Stage I choroidal melanoma (AJCC)
3	06.10.20	F	78	PEHCR	↔	↑	↔	F2F 8 months	No evidence of change
4	27.10.20	M	70	Choroidal melanoma	↔	↑	NP	F2F 9 months	No evidence of new tumour recurrence
5	10.11.20	F	71	Choroidal melanoma	↑	↑	NP	F2F 6 months	No evidence of new tumour recurrence
6	02.02.21	M	64	Indeterminate choroidal lesion	↔	↑	NP	F2F 4 months	No change in tumour activity
7	16.02.21	M	43	Choroidal naevus	↔	↑	↔	F2F 4 months	No change in tumour activity
8	16.02.21	M	88	Choroidal naevus	↑	↑	↑	F2F 3 months	Stage I choroidal melanoma (AJCC)
9	23.03.21	M	63	Indeterminate choroidal lesion	↔	↑	NP	Virtual clinic 6 months	No change in tumour activity
10	30.03.21	M	61	Indeterminate choroidal lesion	↔	↑	↔	Virtual clinic 9 months. Referred to local HES for ultrasound suspicion of retinal tear	Awaiting review
11	10.08.21	M	74	Choroidal naevus	↔	↑	NP	F2F 6 months	Awaiting review

↔ indicates no change compared to the previous visit.
↑ ultrasound indicates increase in tumour size; ↑ OCT indicates increase in subretinal fluid.
AJCC indicates the American Joint Committee on Cancer melanoma staging system (8th edition).
F2F indicates face-to-face.
MDT indicates multi-disciplinary team.
NP indicates not performed.
PEHCR indicates peripheral exudative haemmorhagic chorioretinopathy.

DATA AVAILABILITY

The data that support the findings of this study are available from the corresponding author, OY, upon reasonable request.

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AUTHOR CONTRIBUTIONS

OY: Substantial contribution to acquisition, analysis, interpretation of data for the work. Drafting the work, revising it for critically important intellectual content. Final approval of version to be published. Accountable for all aspects of the work in ensuring questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. JC: Revising the work for critically important intellectual content. Drafting the work. Final approval of version to be published. MG: Revising the work for critically important intellectual content. PC: Revising the work for critically important intellectual content. VC: Revising the work for critically important intellectual content. Final approval of version to be published.

COMPETING INTERESTS

The authors declare no competing interests.

STATEMENT OF ETHICS

This work formed part of a retrospective audit; the requirement for informed consent was thus waived.

ADDITIONAL INFORMATION

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