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LETTER TO THE EDITOR

To assess whether a "virtual admission" can be useful for Parkinson's disease patients with severe motor fluctuations

Anna Randall [1] · J. Panicker [1] · A. Macerollo [1,2] · S. H. Alusi [1]

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Dear Editor,

We present a project focused on exploring alternative methods of assessing and treating Parkinson's disease (PD) patients with severe motor fluctuations, for whom single video or telephone assessments did not give sufficient monitoring opportunities during the COVID-19 pandemic. In "pre-pandemic era," these patients would be considered for hospital admission or frequent face-to-face assessments. Our intention was to implement a virtual admission for patients in need of intensive monitoring and prompt adjustment of treatment. Previous studies investigating telemedicine for PD patients were focused on single interactions comparable to outpatient clinic appointments [1–3]. To the best of our knowledge, there are no other studies employing telemedicine as a "virtual admission."

The study had two inclusion criteria: diagnosis of PD with disabling motor fluctuations following first line management steps and possibility of access to technology supporting video calls.

The two exclusion criteria were as follows: deterioration in PD control due to an alternative process (i.e., concurrent infection) and initial management steps not yet explored.

Five patients who reported severe motor fluctuations were included in the project undertaken over a three-week period. We offered each identified patient a monitoring period of 5 days, during which they would undergo video assessments in their own home. Prior to commencement, the patient and their caregiver were contacted to explain how to set up their surroundings, what the assessments would entail, and ensure caregivers were present and able to participate (with appropriate consent). We also asked for on/off charts to be completed for 48 h, these were reviewed before the baseline assessment on day 1. Outcomes were Movement Disorder Society-Sponsored Revision of the Unified Parkinson's Disease Rating Scale (MDS-UPDRS), patient reported satisfaction, and adverse events. At baseline (day 1), clinical history and medications were reviewed, and MDS-UPDRS was completed in both ON and OFF state (Table 1). Treatment changes were instituted as necessary. On day 3, clinical progress, side effects, and complications were assessed, allowing for any necessary adjustments to be made. Day 5 assessment allowed for final review of progress and complications, with further assessment of MDS-UPDRS.

A clinical letter was sent to the GP and copied to the patient and specialist nurse (if involved) after 5 days.

This project is driven by the need for a method with which to closely monitor and adjust treatment in such patients, during a time where the risks of face-to-face assessment are significant [4]. The additional benefits pertain to the well-known risks of hospital attendance in PD patients—falls, infection, change in mental status among others. Further advantages might be expected due to elimination of the physical and psychological impacts of hospital attendance, such as the discomfort of long journeys, stress, and financial expense [5]. We often factor in the effects of such stress on the severity of patients' symptoms at the time of clinical assessments; we hoped that assessment in the home environment may improve on this. There were some drawbacks of video assessments. The completeness and quality of examination relied heavily upon the technology available to the patient and the availability of caregiver support. Using video consultation, it was not possible to assess postural symptoms and determining the degree of rigidity was difficult. The ability to assess amplitude of tremor largely depended upon the device used by the patient, and the skill of the caregiver at positioning the camera. Therefore, full and accurate MDS-UPDRS score was not possible.

✉ Anna Randall
anna.randall@thewaltoncentre.nhs.uk

[1] The Walton Centre for Neurology and Neurosurgery, Liverpool, UK

[2] Faculty of Health and Life Sciences, University of Liverpool, Liverpool, UK

Table 1 MDS-UPDRS outcomes at baseline and follow-up. Motor examination excludes the scores for postural stability. Rigidity is assessed by observation and best attempt at estimate

Patient	Assessment	Ia	Ib	II	III-on	III-off
1	Baseline	0	8	16	20	62
	Follow-up	0	3	14	12	11
2	Baseline	0	4	12	20	31
	Follow-up	0	0	6	22	28
3	Baseline	9	11	29	17	51
	Follow-up	9	10	27	17	46
4	Baseline	3	8	16	42	*
	Follow-up	3	6	14	34	
5	Baseline	7	18	31	44	46
	Follow-up	5	16	27	22	23

*Patient did not tolerate assessment during off periods

In the current project, the referral for virtual admissions was prompted by the patient's own neurologist or by the PD specialist nurse. This was on the basis of any of severe motor fluctuations, prolonged off periods, or problematic dyskinesia. In all circumstances, the patients had disease duration more than 5 years and were established on oral medications, and in one patient apomorphine. Initial steps to optimize symptoms were not successful and the clinician concluded that a period of monitoring was necessary to guide further treatment decisions.

Following positive experiences by both patients and clinicians, the authors hope to widen the availability of this assessment process for all PD patients. In order to do this, the referral process must be further developed as it was proposed by Cilia et al. [6] In this study, PD nurses made all initial patient contact and used a coding system based on morbidity risks and change in level of dependence in order to guide urgency of assessment by the neurologist. This method of triage was effective at selecting those patients who would benefit from a more intense level of virtual assessment. We feel that there would be much to gain from instituting such processes within our project.

Being our first experience of using video assessment for a virtual admission, extra time was required to plan for instructing patients, ensuring technology worked properly, and setting up means of delivering medications quickly via pharmacies. However, when considering the advantages to those for whom conventional consultation opportunities are impacted significantly by hospital accessibility, we feel that video assessments may be used as a replacement method. This would of course be with the caveat that awareness is maintained regarding difficulty assessing postural symptoms and to a degree, the rigidity. If this method allows patients to make contact sooner, and more regularly, we hypothesize that overall health benefit could be greater in such circumstances.

We hope that in the future and with the experience we have gained, this can be streamlined.

Despite this limitation, we found that the overall experience from this project for both patients and clinicians was positive. Direct patient feedback is shown in Box 1.

Box 1 Comments reported by patients

"Following our recent video consultation I found it to be a very useful alternative to a face-to-face one given that under the circumstances the latter was not possible. It can save what might otherwise be a stressful and uncomfortable journey, plus the additional inconvenience of having to arrange for someone to accompany me there and back. I think it is a good idea to consider it for future consultations in order to reduce the number of times that I would need to travel to in order to attend these."

"Although I had a few issues with the initial setting up of the call, once I became more familiar with the process and the software, it was very easy, and worked well."

"Consultation was excellent. Small changes were made to help manage the condition and there was a good opportunity to ask questions. Discussed questions and explanations which allowed participation in managing my medications."

"Easy to understand, I feel much more positive about ability to manage the condition. I had a chance to explain the symptoms"

"I thought it was a very relaxed appointment and had no problem in asking questions which was all answered to my satisfaction. I felt much better after the appointments and feel as though I am in a better position to understand and manage my condition. I felt fully involved with the appointments and feel now much better to move forward with my treatment."

We recognize that patient satisfaction is difficult to predict and is dependent upon individual factors. For some people, face-to-face consultations provide more reassurance and the opportunity to build trust and rapport, whereas for others, avoiding the practical tasks necessary for hospital admissions is preferable.

We are aware that another limitation of this study is that there was not collection of a formal feedback from clinicians through a specific questionnaire of physicians' evaluation of virtual vs conventional consultation within-subjects. However, informal feedback from participating clinicians summarized that there are clear benefits including the ability to assess patients during times when they felt symptoms to be most representative (at home where they are not subject to the stress of travel) and as regularly as necessary. This was off-set by the drawbacks of virtual examination. The involved clinicians agreed that this method has a very useful place during the COVID-19 pandemic, and with appropriate revisions, may well have an important role in the future.

In conclusion, we found that factors such as convenience, reduction of stress, and travel costs provided clear benefit. In addition, there were no reported adverse events and infection risks were minimized. Although our patient number was small, our experience suggests that telemedicine for virtual

admission may enhance patient satisfaction and improve patient outcomes. We understand that this should not act as a replacement for all patients, but may perhaps be considered to supplement conventional consultation methods.

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Authors' contributions AR, JP, AM, SHA contributed to the project conception and design.

AR, JP, SHA performed the consultations.

AR collected outcome measures and analyzed data.

AR wrote the first draft.

AM reviewed the first draft; JP and SHA read and commented the first draft.

AR and AM worked on the revised version of the paper to address reviewers' comments.

All authors read and approved the final manuscript.

Data availability NA

Compliance with ethical standards

Conflict of interest None

Ethical approval We confirm that the study has been approved by the Trust Ethical Committee and all patients have signed a consent form

Code availability NA

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