APOmorphine infusion and AMYloid deposition in Parkinson's disease (APOMYL): preliminary clinical and amyloid imaging data

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Objective

To explore the potential effects of chronic treatment with Apomorphine on reducing brain Amyloid-β (Aβ) deposition in Parkinson's disease (PD).

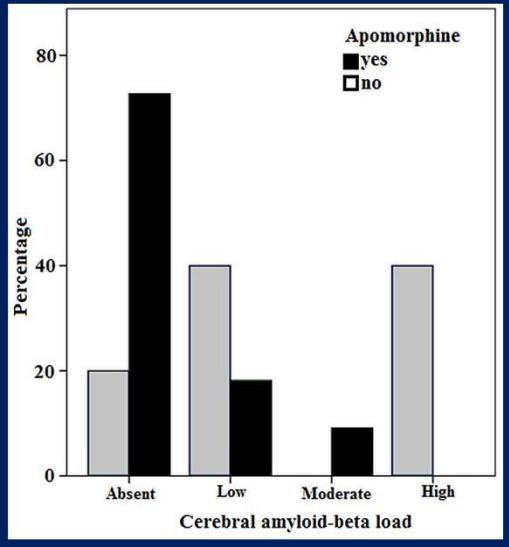
Background

- Majority of PD patients will develop functionally significant cognitive decline and Aβ plaque deposits have been implicated as a major contributing factor[1].
- In a transgenic rodent model of Alzheimer disease, treatment with Apomorphine induced a decrease in intraneuronal Aβ and a simultaneous improvement in cognitive functioning[2].
- In PD patients there is some evidence to suggest that Apomorphine may have a beneficial effect on Ab where it was shown that in cognitively normal PD patients, ante-mortem exposure to Apomorphine significantly reduced cerebral Aβ deposition[3].

Methods

- 11 PD patients on long-term Apomorphine treatment underwent cerebral Amyloid PET scanning. Five non-demented PD patients not on Apomorphine treatment served as a control group.
- For each subject the following demographic data were recorded: age, disease duration, Hoehn and Yahr stage (HY), Levodopa equivalent dose (LED), Scales for Outcome in Parkinson's disease (SCOPA).
- The primary outcome measure in this study was cerebral Aβ burden (scored as absent – low – moderate – high).
- Secondary outcome measures consisted of Mini Mental State Examination (MMSE), Non Motor Symptoms Scale (NMSS), Hospital Anxiety and Depression scale (HADS) and PD Sleep Scale (PDSS) scores.
- Chi-square test was used to analyse the primary outcome, and Wilcoxon signed-rank test for analysis of the secondary outcomes. This study was approved by a local Research Ethics Committee in the United Kingdom (REC 17/WM/0287; IRAS 214953).

Apomorphine	Aβ burden	Age (yrs)	Duration (yrs)	HY	LED (mg)	SCOPA motor	MMSE	NMSS	HADS	PDSS
Yes (n=11)	Absent 72% Low 18% Moderate 9% High 0%	70 [52-90]	14 [2-23]	3.5 [2-5]	1168.5 [750-1810]	15 [7-28]	28 [21-30]	53.5 [14-88]	9.5 [5-22]	87 [53-115]
No (n=5)	Absent 20% Low 40% Moderate 0% High 40%	75 [49-77]	9 [1-14]	4 [2-5]	1128 [700-2864]	14 [10-34]	29 [25-30]	77 [56-162]	19 [14-24]	54 [38-116]
P-value	0.09	0.72	0.10	0.57	0.65	0.92	0.41	0.19	0.048	0.63



Results

- PD patients on continuous Apomorphine infusion had been on this treatment for 51 [10-180] months (n=11).
- There were no differences in baseline demographics, LED, or motor scores (p≥0.10) compared to patients not on Apomorphine (n=5) (Table).
- The distribution of cerebral Aβ burden showed a trend towards significant change between patients on Apomorphine and those without (p=0.09; Table and Figure).
- There were no group differences in MMSE scores, but we identified lower depression scores using the HADS in patients receiving long-term Apomorphine treatment (p=0.048).

References

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Conclusions

Although open label, this study provides the world-first real-life evidence that Apomorphine infusion may be protective against cerebral Ab accumulation in PD. Reducing cerebral Ab has the potential to improve cognitive function in PD and enable more widespread use of advanced therapies. Future research should focus on a trial with PD patients with positive Aβ imaging and/or reduced cerebrospinal Ab levels and Ab-based therapy (Apomorphine) to reduce cognitive burden.

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