A REVIEW OF COMPLEMENTARY MEDICINE IN PARKINSON'S DISEASE

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INTRODUCTION

The discovery of neurotransmitters revolutionised our understanding of neurological diseases and the functioning of the brain. Parkinson's disease (PD) was the first disease in which levodopa was successfully used to improve the quality of patients' lives.[1] Unfortunately, PD is a progressive, chronic condition and medical and surgical treatment is effective for a limited period only. A proportion of patients therefore resort to alternative therapies to complement conventional therapies, thus hoping to improve their quality of life. The approach of combining conventional and complementary therapies (CTs) is known as integrated or holistic medicine.[2, 3] Holistic medicine considers each patient as a functioning whole – a physical, mental, emotional and spiritual being.

Physicians should be well-informed about the use of CT taken by patients in relation to PD, enabling them to give objective and impartial advice and information to PD patients, to help them make the best choices about such therapies.

DEFINITION

Alternative therapy is defined as a treatment whose use is based on belief rather than on scientific proof of efficacy. It is to an extent synonymous with CT, which is used in this article. Most patients with PD use CT in parallel with conventional therapy.[4,5]

HOW WIDESPREAD IS THE USE OF CT FOR PD?

Numerous studies show that CT is used widely in chronic disorders such as PD: 20% of the British population were using CTs in a study conducted in 1999.[6] Thirty-four per cent of American adults use at least one form of CT for chronic medical conditions;[4,5] 52% of elderly out-patients in a British-based study were using non-prescribed medication and 40% were using CT for a variety of conditions.[7]

In PD, 40% of American patients reported the use of at least one CT for PD[8] with 26% using two therapies; 33% used three or more and 12% used five or more therapies. The most commonly used CTs were vitamins (especially vitamin E) (20%), massage (14%), acupuncture (10%), relaxation techniques (8%) and magnets (5%).

A survey by the Parkinson's Disease Society (UK) showed that 34·9% of patients (the majority of users being less than 65 years old) with PD had used CT with commonly used therapies being reflexology (9·3%), aromatherapy (9·2%), massage (8·8%), relaxation and meditation (8·5%) and acupuncture (7·6%).[9] A more recent study in the UK showed a prevalence of 39% of patients with PD using at least one CT for PD: massage (6·2%), aromatherapy (5·4%), acupuncture, reflexology and spiritualism each 2·7%.[10] (Quoted percentages are out of total sample).

WHAT ARE THE CHARACTERISTICS OF PD PATIENTS WHO USE CT?

Complementary therapies tend to be used by younger, more affluent and better-educated patients with PD.[9, 10] This age discrepancy is partly explained by the lack of mobility of older people who are therefore less capable of visiting complementary therapists. Parkinson's disease patients usually get to know about CT through a family member or friends in nearly a half of cases, or the media in a quarter of cases.[9] It was revealing that most PD patients using CT do not consult the physician treating their PD before starting the use of these therapies, nor do doctors ask about their use.

TYPES OF CTs

Acupuncture[11] (China, 500 BC)

Acupuncture involves the insertion of hair-like needles into certain points of the body aimed at correcting any imbalance in the flow of *qi* within the body. Acupuncture, it has been claimed, improves the clinical features in PD, slows down its progression, and has a drug-sparing effect.[11]

Auriculotherapy[12] (1950s)

Auriculotherapy involves the insertion of a needle, with or without the application of low voltage electricity, into the earlobes. This therapy is said to reduce tremor, imbalance, rigidity and bradykinesia. Patients with early PD may postpone the need for medication if they are receiving auriculotherapy for 40–60-minute sessions twice weekly initially and subsequently once-weekly.

Herbal medicine[13, 14]

Ayurvedic medicine is the ancient Indian medical doctrine that aims to balance the state of internal and external body energy. The following are some of the Ayurvedic herbs and minerals that are used for PD.

Gingko biloba

It is an antioxidant and circulatory stimulant. It is said to increase the uptake of levodopa at its target sites and may have 'alerting' properties, which can counter the

daytime somnolence caused by levodopa. It may also improve cognitive function.

Evening primrose oil (Oenothera biennis)
This oil tends to reduce tremors by increasing the availability of levodopa. In one study, tremor was reduced in 55% of patients who took two teaspoonfuls daily for several months.[13] It contains tryptophan, which may boost the effects of levodopa.

Passion flower (Passiflora incarnata)
Contains harmine and harmaline-like alkaloids; can have a beneficial effect on agitation and insomnia.

Milk thistle (Silybum marianum)
It is a liver tonic and may protect the liver from environmental toxins such as carbon tetrachloride and alcohol.

St John's wort (Hypericum perforatum)
It is an antidepressant, similar to selective serotonin reuptake inhibitors, but causes tremor.[15]

Datura stramonium seeds
These have an anticholinergic effect.

Mucuna pruriens (seed is atmagupta)[16] and *Vicia faba*[17, 18] contain levodopa (see later).

Claviceps purpura
Bromocriptine is extracted from *Claviceps purpura* – a fungus.[19]

Banisteria caapi (Banisterine)[20] and *Nicotiana tabacum* (the tobacco plant) are known to contain monoamine oxidase inhibitors.[21]

It is obvious that many of these preparations contain within them substances which are closely related to the conventional drugs that are prescribed in PD.

Homeopathy (eighteenth century)
The aim of homeopathy is to cure an illness or disorder by treating the whole person rather than merely concentrating on a set of symptoms and its remedies are based on the concept that 'like cures like'. The remedies are derived from plant, mineral and animal sources and used in extremely dilute amounts. The remedies are prepared by a process of serial dilution and succussion (vigorous shaking). The more times this process is repeated, the greater is said to be the 'potency' of the remedy. Many of the Ayurvedic medicines mentioned above are used in this way.

Chiropraxis[22]
Chiropractic management of patients with PD is not well-researched. A case report describes successful subjective and objective outcomes through the use of upper cervical chiropractic care in a 60-year-old man with PD.[22]

Massage[23]
Massage therapy may reduce the latency of antiparkinsonian medication by about 33%, and massage may also reduce rigidity and provide relief of tremor for up to five hours following a therapy session. A case report describes a 71-year-old PD patient with tremor, which became more intense with anxiety: application of firm pressure on the C7 vertebra level reduced the tremor greatly.[23]

The mechanism of action of massage is unknown but a suggestion is a stimulation of the release of dopamine from nerve terminals. Massage used on the lower extremities may ease rigidity and assist patients to normalise gait, gain a sense of balance, and minimise the risk of falls.[12]

Massage therapy cannot be tested by double-blind controlled trials, and clinical observation is the only evidence that can be collected. It may work through relaxation or reduction in anxiety or by release of endorphins or substance P through stimulation of sensory nerves.

Reflexology (China, 3000 BC)
This technique of diagnosis and treatment involves massage of tender points on the soles of the feet and this is believed to result in relaxation. As no data exist on the effectiveness of this therapy in PD, a pilot study is underway to test the practicality of carrying out a full-scale randomised controlled trial (RCT).

Vitamins and antioxidants[24–30]
The role of vitamins in delaying the onset or halting the progress of PD remains unknown. Multivitamin use was found to delay the onset of PD by 3·2 years in an epidemiologic study of 203 PD sibling pairs;[24] many of those taking multivitamins were reported to be taking vitamin E, vitamin C and carotene. The delay in onset of PD, as shown, may be related to the potential antioxidant effects of the vitamins or it may be that multivitamin use is a marker for other co-existant useful health promotion practices such as exercise, diet, socioeconomic status or other drug use.

The DATATOP trial[25] found no detectable benefit with vitamin E on PD progression. A case-control study[26] compared retrospectively-documented intake of dietary vitamin E and selected vitamin E-containing foods in patients with PD and controls. This study showed that the absence of PD was significantly associated with prior consumption of legumes (a dietary variable preselected for its high vitamin E content, but also high in selenium). In this study, vitamin E consumption on its own was not associated with any difference in PD occurrence.

Another retrospective study[27] has demonstrated a statistically significant relationship between a high intake of dietary vitamin E (odds ratio of 0·5, 95% confidence interval per 10 mg daily of vitamin E intake) and protection against the occurrence of PD. In the same study however, there was no similar relationship in protection against the occurrence of PD with the intake of beta carotene, vitamin C and flavonoids.

Another retrospective study showed an inverse relationship between intake of beta-carotene and vitamin C, but not vitamin E, and the development of PD.[28]

Thus, although antioxidants may play a protective role in PD, a causative relationship still cannot be concluded due to the retrospective nature of the studies.

Studies on mice[29] showed that if they were fed folate-deficient diets, they developed severe Parkinson-like symptoms: this was attributed to elevated levels of homocysteine in the brain. Patients with PD often have low levels of folic acid but it is not clear whether this results from the disease process itself or from associated malnutrition.

In PD patients who use a medication that contains levodopa, consumption of large amounts of vitamin B6 (>15mg) can affect the absorption of levodopa. This vitamin converts levodopa to dopamine in the stomach and bloodstream.

Coenzyme Q10 is a powerful antioxidant and its concentration reduced in platelet mitochondria of PD patients. In a pilot study[30] in which three oral doses of Coenzyme Q10 were given to PD patients, there was no change in the motor activity although Q10 was well-tolerated and the plasma coenzyme Q10 level was increased. A prospective randomised double-blinded clinical trial of coenzyme Q10 in early PD is currently underway.

Dietary sources of levodopa

The broad bean (*Vicia faba*) contains levodopa in pharmacologically active amounts.[17,18] A 100 g serving of *Vicia faba* pods contains about 250 mg of levodopa equivalent to the levodopa content of one of the standard pharmaceutical formulations. Levodopa also occurs naturally in significant quantities in several other leguminous species such as the Georgia velvet bean (*Stizolobium deeringanum*) and the legumes and seeds of the Indian medicinal plant, *Mucunia pruriens*. HP-200 prepared from the beans of *Mucunia pruriens* was found to be a safe and effective alternative to levodopa for patients with PD.[16]

Exercise[31]

An exercise programme designed to improve spinal flexibility and coordinated movement improved axial mobility and physical performance in early to mid-stage PD in an RCT.[31]

Taijiquan[32]

In this ancient form of Chinese martial art, a series of individual slow, dance-like movements are linked together in a continuous sequence with a smooth flow from one movement to another. It has been shown to reduce the number of falls in older adult fallers.[32] This finding may be highly significant to PD, and a double-blind randomised interventional trial is currently underway to test which type of exercise modality (Taijiquan, aerobic exercise training or Qigong) will be most beneficial for PD patients.[33]

Feldenkrais[34]

The Feldenkrais method is a form of somatic education that uses gentle movement and directs attention to movement patterns in an aim of improving movement and human functioning; it has been used to increase range of motion, improve flexibility and coordination and the efficiency with which movements are performed. It is thought to benefit people with neurological disorders like PD, but there are no published studies to demonstrate this.

Yoga (India, 3000 BC)

The complex discipline of yoga primarily focuses on the physical postures called asanas. The potential benefits include improved strength and flexibility, stress reduction and a sense of psychological wellbeing. There are currently no studies on yoga and PD. Despite its widespread use in the West, it is not known whether yoga has any role in the treatment of PD.

Conductive education[35,36] (1950)

Conductive education is an educational approach which helps individuals develop the skills and motivation they need to overcome everyday problems of movement and bodily control. Conductive education is an established approach to rehabilitation, but its role in patients with PD remains largely unresearched.

Alexander technique[37] (Frederick Mathias Alexander, 1869–1955)

The Alexander technique aims to improve muscle tone, coordination, balance and motor control, by educating the individual to give greater attention to proprioceptive stimuli and to develop choice of response. The Alexander technique was evaluated in PD patients who showed a statistically significant improvement in depressive symptoms and a more positive body concept – patients also had less difficulty in performing daily activities after a 12-lesson course in the Alexander technique. It should be noted that there was no control group in this study. An RCT is underway.

Dance movement therapy[38]
Dance movement therapy is aimed at helping people to resolve deep-seated problems by communicating with and relating to others through the medium of physical movements and dance. In a study[38] it was shown that dance movement therapy improved initiation in patients with PD but did not have a statistically significant benefit on the patients' depressive symptoms.

Aromatherapy
Aromatherapy is a healing method using very concentrated essential oils that are often highly aromatic and are extracted from plants. No literature on aromatherapy and PD exists.

Music therapy[39–42] (mid-twentieth century)
Music therapy is the building of a relationship between the patient and a specially-trained therapist using music as the basis for communication. The therapist, who usually has a qualification in music, uses musical instruments, vocal sounds and singing to build a relationship with the patient. Many anecdotal positive accounts of the success of music therapy record an improvement in the quality of life of PD patients by this means, which raised to its maximum potential their social, physical and psychological functioning being.

Rhythmic auditory stimulation (cueing) improved the mobility of PD patients[39] and helped to overcome akinetic freezing.[40] Subjective improvement in walking, balance, posture and speech as well as a reduction in dyskinesia as documented in two small studies which were conducted on patients attending joint physiotherapy, speech therapy and music therapy sessions.[41]

A case report[42] records improvement in the psychological implications of communication deficits in PD with the use of music therapy. In all reports, the effect of music therapy was short-lasting (less than 24 hours), but in some cases it was possible for the patient to prolong the benefit by consciously recalling musical associations.

Mind–body medicine[43, 44]
The clinical association between the mindset and the severity of PD is well known: symptoms improve with relaxation and are exacerbated with anxiety. Most of the evidence for an effective use of mind–body medicine are case reports on hypnosis. In one case report,[43] a patient with a severe parkinsonian tremor was taught self-hypnosis and performed it up to four times daily in conjunction with taking medication for PD. The hypnotic sessions were first practised while the patient was being monitored with polygraphic electroencephalogram and electromyogram (EMG) recordings. This study showed a direct correlation between the degree of the hypnotic trance and the cessation of tremor with the effect lasting for a few hours after each session. Over a period of six months, and with repeated practice (mainly of 'guided imagery'), the patient reported significant improvement in clinical status. Another case report[44] demonstrates the 'glove analgesia' technique with transfer to indicated head and chest sites, combined with hypnotic imagery to alleviate a PD patient's depressive symptoms. The mechanism by which hypnosis improves PD tremors is still not well-understood.

Mental relaxation[45]
Transcendental meditation by Maharishi Yogi (1966) is a mental relaxation and maturation technique that is said to improve and normalise the emotional state and also improves the ability to focus attention, neural reaction time and mind–body coordination without drugs.[45] A highly significant increase of 5-hydroxyindole-3 acetic acid (5-HIAA) occurs in patients practising transcendental meditation.[45] This suggests that systemic serotonin (the precursor of 5-HIAA) is the 'rest and fulfillment' hormone of deactivation-relaxation.

Biofeedback
Frontal EMG biofeedback and progressive relaxation training on manual motor functioning was tested in patients with PD and in controls,[46] and a brief manual motor assessment was set for both groups before and after the intervention. The PD patient group who underwent weekly sessions of frontal EMG and relaxation for 15 weeks showed a significant lowering of frontal EMG activity, when compared with the control group, but no significant change in motor skills.

CONCLUSION
Conventional treatment for PD uses levodopa or dopamine agonists and this therapy has revolutionised the lives of these patients. Whilst physicians are aware of these advances, they are unaware of CT taken by their patients. They are unaware of the effects some patients say they derive from these medicines, and often their views are biased and prejudiced against CT. Patients do not share this bias and consequently do not tell their doctor that they feel better on the benefits of the medicine they are buying across the counter or receiving from other personnel.

UK-based surveys[9, 10] show that almost one-third of PD patients take CT and the majority feel that their quality of life is improved. Whether CTs have a long-term effect is not clear, and at times it is difficult to disentangle the individual effect of CT from conventional treatment. Considerable benefit may be derived from music, massage and movement therapy such as Taijiquan, and it does seem to have a positive effect on patients' lives. Importantly these treatments do not have side-effects.

Clinicians may be faced with PD patients requesting

advice about whether they should be using CT at all and what types of CT are safe to use in PD. The clinician should make sure that the patient is concurrently being managed by conventional care. If the patient still wishes to pursue CT, then he/she should be encouraged to find a registered, reputable practitioner who will be willing to communicate and cooperate with the patient's conventional practitioner. The patient should also be encouraged to learn more about general and specific adverse effects of the individual therapies.

The scientific establishment needs to look at the wide variety of 'treatments' taken by patients, and it is also necessary for us to plan studies to evaluate the effects of these therapies. Even if they have marginal effects, this can be of great significance to a patient who has a chronic and relentlessly progressive disease, and gives an opportunity to the carers and relatives to be involved in the management of the patient.

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