signs of slight, but not clinically important, improvement.[14] In the same year (1988) a report from Mexico of combined substantia nigra and adrenal medulla implant in two patients said that the patients showed some improvement two months after surgery. In Britain two transplantations were performed using fetal tissue of 14-16 weeks' gestation implanted without immunosuppression into the right caudate nucleus.[15] Surprisingly, an immediate response was reported that was then apparently sustained, though the condition of some patients in a larger series later deteriorated.

Earlier this year the group from Sweden and London reported their experience with a single patient after a unilateral implantation into the putamen.[16] Immediate improvement was not seen, but from the second month the time that the patient spent in "off" periods was much reduced, and this was associated with improvement in rigidity and mobility. As had been found previously improvement was not solely on the contralateral side. An important finding was the evidence of graft survival with increased tracer uptake in the putamen that was not thought to be secondary to a breach in the blood-brain barrier. Further studies will look at the need for immunosuppression and for growth factors. Whether the underlying disease will in the end destroy the graft is an issue. Treatment with deprenyl or other purported neuroprotective agents may enhance survival of grafts.

Possibly we are close to another treatment for the symptoms of late stage Parkinson's disease. The efficacy of the technique has to be defined, however, and careful follow up is crucial to determine whether the improvement is maintained. We also need to know that the graft cannot undergo uncontrolled growth, that changes in mental state do not become obtrusive, and that abnormal synaptic connections do not cause problems. Many other fundamental questions have to be answered—and they may be better investigated in rats or primates. Firm standards have been set for the assessment and choice of patients, and all results must be reported, preferably from a few centres performing prudent clinical studies that are assessed by positron emission tomography and that have close relations with research teams working with animals.

The neurodegenerative diseases are rapidly and rightly becoming one of the most important health issues of our time. Properly funded and conducted studies are needed on all new treatments, including implants, and those should run in parallel with the development of preventive and neuroprotective measures. In the long run an organised approach of this kind will be far cheaper than chaotic development of an expensive surgical "half way technology" approach—but it will need capital investment now.

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1 Perlow MJ, Freed WJ, Hoffer BJ, Seiger A, Olson L, Wyatt RJ. Brain grafts reduce motor abnormalities produced by destruction of nigrostriatal dopamine systems. *Science* 1979;**204**: 643-7.
2 Bjorklund A, Stenevi U. Reconstruction of the nigrostriatal dopamine pathway by intracerebral nigral transplants. *Brain Res* 1979;**177**:555-60.
3 Bjorklund A, Dunnett SB, Stenevi U, Lewis ME, Iversen SD. Reinnervation of the denervated striatum by substantia nigra transplants: functional consequences as revealed by pharmacological and sensorimotor testing. *Brain Res* 1980;**199**:307-33.
4 Freed WJ, Perlow MJ, Karoum F, *et al.* Restoration of dopaminergic function by grafting of fetal rat substantia nigra to the caudate nucleus: long-term behavioral, biochemical and histochemical studies. *Ann Neurol* 1980;**8**:510-9.
5 Schultzberg M, Dunnett SB, Bjorklund A, *et al.* Dopamine and cholecystokinin immunoreactive neurones in mesencephalic grafts reinnervating the neostriatum: evidence for selective growth regulation. *Neuroscience* 1984;**12**:17-32.
6 Schmidt RH, Bjorklund A, Stenevi U. Intracerebral grafting of dissociated CNS tissue suspensions: a new approach for neuronal transplantation to deep brain sites. *Brain Res* 1981;**218**:347-56.
7 Freund T, Bolam JP, Bjorklund A, *et al.* Efferent synaptic connections of grafted dopaminergic neurons reinnervating the host neostriatum: a tyrosine hydroxylase immunocytochemical study. *J Neurosci* 1985;5:603-16.
8 Dunnett SB, Bjorklund A, Schmidt RH, *et al.* Intracerebral grafting of neuronal cell suspensions. 4. Behavioural recovery in rats with unilateral implants of nigral cell suspensions in different forebrain sites. *Acta Physiol Scand* 1983;Suppl 522:29-37.
9 Bjorklund A, Schmidt RH, Stenevi U. Functional rennervation of the neostratum in the adult rat by use of intraparenchymal grafting of dissociated cell suspensions from the substantia nigra. *Cell Tissue Res* 1980;**212**:39-45.
10 Backlund E-O, Granberg P-O, Hamberger B, *et al.* Transplantation of adrenal medullary tissue to the striatum in parkinsonism: first clinical trials. *J Neurosurg* 1985;**62**:169-73.
11 Lindvall O, Backlund E-O, Farde L, *et al.* Transplantation in Parkinson's disease: Two cases of adrenal medullary grafts to the putamen. *Ann Neurol* 1987;**22**:457-68.
12 Madrazo I, Drucker-Colin R, Diaz V, Martinez-Mata J, Tores C, Becerril JJ. Open neurosurgical autograft of adrenal medulla to the right caudate nucleus in two patients with intractable Parkinson's disease. *N Engl J Med* 1987;**316**:831-4.
13 Goetz C, Olanow CW, Koller WC, *et al.* Adrenal medullary transplant to the striatum of patients with advanced Parkinson's disease. *N Engl J Med* 1989;**320**:337-41.
14 Lindvall O, Rehncrona S, Brundin P, *et al.* Human fetal dopamine neurons grafted into the striatum in two patients with severe Parkinson's disease. *Arch Neurol* 1989;**46**:615-31.
15 Hitchcock ER, Clough C, Hughes R, Kenny B. Embryos and Parkinson's disease. *Lancet* 1988;i: 1274.
16 Lindvall O, Brundin P, Widner H, *et al.* Grafts of fetal dopamine neurons survive and improve motor function in Parkinson's disease. *Science* 1990;**247**:574-7.

Trials and tribulations in speech therapy

At a guess we need more therapists

Patients who lose the ability to communicate through language after a stroke or other neurological catastrophe need help, as do those with swallowing disorders caused by conditions such as motor neurone disease.[1] Such help can come from speech therapists. Randomised controlled trials of speech therapy in patients with aphasia after stroke, however, have cast doubt on the efficacy of some speech therapy methods. Unfortunately this has in turn prompted the rejection by some therapists of randomised trials as a valid method of assessing their skills.

Lincoln and her colleagues from Nottingham attracted much misunderstanding with their randomised trial.[2] They found no difference after six months in communication ability between patients who had had no speech therapy and those who had had "routine therapy" for only two hours a week. This finding does not imply that all speech therapy is useless, but clearly that available in Nottingham at the time (and probably elsewhere in Britain) was of little benefit.

Wertz *et al* reported a crossover study in which the control patients received no therapy for 12 weeks then formal speech therapy for 12 weeks.[3] The treatment group received 12 weeks' therapy from either speech therapists or volunteers and then no therapy for 12 weeks. After 12 weeks there was a significant improvement in the treated group over the control group but no significant difference between those treated by speech therapists and those treated by volunteers. In the second 12 weeks the control group caught up with the treated group so that after 24 weeks there was no difference between them. Therefore, the speech therapy, which was more intensive than in Nottingham (eight-10 hours), was doing something. Unfortunately, there was no group receiving no treatment at all for 24 weeks to test whether therapy was more than speeding up natural recovery.

To try to separate the therapists' effect from the effectiveness of their therapies Hartman and Landau randomly assigned 60 patients to either formal speech therapy or "only"

supportive counselling from speech therapists.[4] There was no difference between the two groups at follow up, suggesting that speech therapists might perform for aphasic patients the role Voltaire ascribed to physicians who "successfully entertain their patients while nature effects a cure." Notwithstanding Voltaire's cynicism, he describes an important aspect of a good physician's care[5]: patients value an expert's guidance through the frightening terrain of an unfamiliar illness even if there is no clearly effective treatment—as neurologists should know.

Like Wertz *et al*, David *et al* also showed that volunteers, guided by speech therapists' assessments, achieved results similar to professional therapists.[6] This finding has been interpreted as confirming the usefulness of speech therapists' assessments.[7] In the United States speech therapists are called speech pathologists, emphasising their diagnostic role in the rehabilitation of aphasic patients. In general, casual assessment of speech (by doctors and nurses as well as relatives) will underestimate the degree of comprehension difficulties. This occurs even when the speech problem is obvious, as in Broca's aphasia, but especially in those with fluent aphasias, who are often thought to be "confused."[8]

The response of many speech therapists to these crude studies of their work resembles that of many doctors (particularly surgeons) to "negative" controlled trials. Each published report is followed by protests that the groups studied were too heterogeneous and the treatments used were inadequate, too short, delayed, and so on. More seriously, some speech therapists have argued that the randomised controlled trial is the wrong instrument to test speech therapies, advocating instead single case designs.[9,10] Certainly these are useful for developing different treatments but are inadequate to test the general application of treatments in the real world. This is especially so with aphasia, with its variable tendency to spontaneous recovery.[11] The rehabilitation of patients with aphasia is a complex process of re-education, the efficiacy of which will be harder to assess than that of streptomycin in tuberculosis.

Speech therapists should not therefore be discouraged by a few negative trials. But neither should they shoot the methodological messenger by rejecting properly controlled randomised trials.[12] Health authorities certainly should not truncate the services of speech therapists simply because their treatments are only variably effective. But we do need more controlled trials that have the statistical power to show which speech therapy regimens can improve on the natural recovery of aphasia. The best guess is that these will show that we need many more speech therapists to provide a proper and effective service.

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1 Campbell MJ, Enderby P. The management of motor neurone disease. *J Neurol Sci* 1984;**64**:65-71.
2 Lincoln NB, Jones AC, McGuirke E, Mulley GP, Lendrem W, Mitchell JR. Effectiveness of speech therapy for aphasic stroke patients: a randomised controlled trial. *Lancet* 1984;ii:197-200.
3 Wertz RT, Weiss RG, Aten JZ. Comparison of clinic, home and deferred language treatment for aphasia: a Veterans' Administration cooperative study. *Arch Neurol* 1986;**43**:653-8.
4 Hartman J, Landau WM. Comparison of formal language therapy with supportive counselling for aphasia due to acute vascular accident. *Arch Neurol* 1987;**44**:646-69.
5 Richardson KT, Globokar A, Pugh DB, Bushmann MM. Aphasia therapy: more than just hand holding. *Arch Neurol* 1989;**46**:249-50.
6 David RM, Enderby P, Bainton D. Treatment of acquired aphasia: speech therapists and volunteers compared. *J Neurol Neurosurg Psychiatry* 1982;**45**:957-61.
7 Wade DT. Can aphasic patients with stroke do without speech therapists? *Br Med J* 1983;**286**:50.
8 Allen CMC, Harrison MJG, Wade DT. *The management of acute stroke*. Tunbridge Wells: Castle House, 1988.
9 Howard D. Beyond randomised controlled trials: the case for effective case studies of the effects of therapy in aphasia. *Br J Disord Commun* 1986;**21**:89-102.
10 Pring TR. Evaluating the effects of speech therapy for aphasia: developing the single case methodology. *Br J Disord Commun* 1986;**21**:103-15.
11 Lendram W, Lincoln NB. Spontaneous recovery of language in patients with aphasia between four and thirty-four weeks after stroke. *J Neurol Neurosurg Psychiatry* 1985;**48**:743-8.
12 Fitz-Gibbon CT. In defence of the randomised controlled trial, with suggestions for the possible use of meta-analysis. *Br J Disord Commun* 1986;**21**:117-24.

Extracorporeal membrane oxygenation

Britain needs units equipped to perform the procedure and a controlled trial

Extracorporeal membrane oxygenation is a technique for providing prolonged extracorporeal circulation and gas exchange, by using extrathoracic cannulation, in patients with acute, potentially reversible cardiac, pulmonary, or cardiopulmonary failure. The procedure was first used in adults, principally in those with the adult respiratory distress syndrome.[1] Although it was effective in supporting pulmonary function, it did not improve survival[2] and so was largely abandoned. Bartlett and coworkers, however, continued their research and showed that extracorporeal membrane oxygenation was an effective treatment for selected, mature neonates with respiratory failure, particularly when associated with persistent fetal circulation. Other groups have since found similar results.[3-11]

Pulmonary vascular resistance and pulmonary artery pressure are normally raised at birth. Asphyxia, the meconium aspiration syndrome, and diaphragmatic hernia may prevent normal adaptation and lead to persistent fetal circulation. Hypoxia, hypercapnia, and acidosis cause pulmonary vasoconstriction, leading to a further rise in pulmonary vascular resistance and pulmonary artery pressure. This causes right to left shunting through the patent ductus arteriosus and across the patent foramen ovale (fetal circulation) and further hypoxia, thus establishing a vicious circle. Conventional treatment is with mechanical ventilation and pharmacological support, but 2-5% of neonates fail to respond. Failure may in part be due to the complications of high pressure mechanical ventilation, such as low cardiac output, pneumothoraces, and bronchopulmonary dysplasia. With extracorporeal membrane oxygenation cardiac output, oxygenation, and carbon dioxide removal can all be guaranteed. Provided that the underlying respiratory condition is reversible the pulmonary hypertension will resolve.

But do we need extracorporeal membrane oxygenation treatment in Britain? A recent editorial in the *Lancet* emphasised the differences in the incidence of the meconium aspiration syndrome and persistent fetal circulation between Britain and North America and highlighted the morbidity associated with the procedure and the lack of controlled trials.[12] The editorial also mentioned an unreferenced study from Vancouver, which indicated that patients who fulfilled the selection criteria for extracorporeal membrane oxygenation might survive without it.

Anecdotal reports suggest that the meconium aspiration syndrome and persistent fetal circulation are less common in Britain than in the United States. Infants with both these conditions often suffer appreciable peripartum hypoxia and may be considered not suitable for intensive care. Diaphragmatic hernia has an incidence of about 1 in 3000 births.[13] Increased detection of diaphragmatic hernia in utero with