TECHNIQUE FOR INJECTING LONG-ACTING NEUROLEPTICS

DEAR SIR,

Long-acting injectable neuroleptics are being used increasingly in the maintenance treatment of schizophrenia. Their advantages are evident since they minimize absorption variability and overcome the problem of non-compliance. However, little attention has been given to their potential complications at injection sites. Reports of subcutaneous lumps and induration (McCreadie, Kiernan, Venner *et al*, 1979; Amdisen and Thomsen, 1981; Lapierre, Chaudhury and Sipos, 1981), abscesses (Starmark, Forsman and Wahlström, 1980) and medication oozing from injection sites (Rifkin, Quitkin, Tieman and Klein, 1976) have all been documented. In our opinion these complications have been underestimated. They can, however, be significantly reduced and, in many cases, prevented by the conscientious application of a good injection technique. Catherine Finlay Kinnes (recommended (*Journal*, February 1981, **138**, 178) the Z-track method for the injection of fluphenazine decanoate to prevent the oozing of medication. We have found that the following technique, which is a combination of the Z-track and air-bubble method, presents significant advantages for the injection of depot neuroleptics and also the long-acting non-depot neuroleptic, fluspirilene. Lumps and induration at injection sites, due to oozing of medication into subcutaneous tissue, are greatly reduced.

The procedure is as follows: (1) using a 2-inch needle, inject no more than 3 cc of medication per injection, into upper quadrant of buttock (to inject more than 3 cc use alternate buttocks and vary injection site); (2) after drawing up medication, draw a small air bubble of 0.1 cc into syringe and change needle for injection; (3) wipe injection site with alcohol swab and allow to dry before giving injection, as alcohol may infiltrate subcutaneous tissue and cause local irritation; (4) stretch the skin over the injection site to one side and hold firmly; (5) inject medication slowly, including air bubble, which forces last drop from needle into the muscle and prevents any medication from being deposited in subcutaneous tissue as needle is withdrawn; (6) wait about 10 seconds before withdrawing needle, then do so quickly and release skin; (7) do not massage injection site as this may force medication to ooze from muscle and infiltrate subcutaneous tissue; (8) precautions should also be taken with glass ampoules to avoid injection of glass particles (Turco and Davis, 1972). A more detailed description of the injection technique is available on request.

We have been using this method in our clinic (Special Follow-Up Clinic of the Allan Memorial Institute) of 300 schizophrenic outpatients for over one year with extremely good results. Before the technique was introduced 23 of 25 patients receiving fluspirilene intramuscularly presented lumps at the injection sites, the great majority of which have now disappeared. We recommend that particular care be taken in the case of fluspirilene because, like most other preparations that are injected intramuscularly, this drug is administered in the form of an aqueous solution and is more likely to cause tissue damage than the depot neuroleptics which are in an oil base.

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References

AMDISEN, A. & THOMSEN, N. J. (1981) Drug levels after withdrawal of long-term depot neuroleptics. *Lancet*, *i*, 1425.

LAPIERRE, Y. D., CHAUDHRY, R. & SIPOS, V. (1981) A long-term efficacy and toxicity study of fluspirilene in chronic schizophrenia. *Current Therapeutic Research*, **30**, 793–802.

MCCREADIE, R. G., KIERNAN, W. E. S., VENNER, R. M. & DENHOLM, R. B. (1979) Probable toxic necrosis after prolonged fluspirilene administration. *British Medical Journal*, *i*, 523–4.

RIFKIN, A., QUITKIN, F., TIEMAN, D. & KLEIN, D. F. (1976) Fluphenazine decanoate. *Lancet*, *i*, 364.

STARMARK, J.-E., FORSMAN, A. & WAHLSTRÖM, J. (1980) Abscesses following prolonged intramuscular administration of perphenazine enanthate. *Acta Psychiatrica Scandinavica*, **62**, 154–7.

TURCO, S. & DAVIS, N. M. (1972) Glass particles in intravenous injections. *New England Journal of Medicine*, **287**, 1201–3.

SEASON OF BIRTH OF SCHIZOPHRENICS: CYCLIC TRENDS AND THEIR ANALYSIS

DEAR SIR,

A recent report by one of us on season of birth of schizophrenics (*Journal*, April 1982, **140**, 410–15) employed the chi-square test to assess variation in quarterly birthrates. This statistical method has the virtue of simplicity and also, having been widely used in similar studies in the past, facilitates comparison between these and previously reported data. However, the chi-square test aims to detect any form of deviation from expected figures, regardless of pattern. In particular, where trends are presumed *cyclic*, this test is insensitive and may not be the most appropriate.

Cyclic trends are compatible with most if not all the hypotheses regarding season of birth of schizophrenics and are supported by evidence from previous studies

(Dalen, 1968, 1974; Ødegård, 1974; Hare *et al*, 1974). It therefore seems reasonable to examine the recently reported data specifically for cyclic trends. Edwards' method (Edwards, 1961), probably the most commonly used, allows the estimation of cyclic trends and also the calculation of the time of year when birthrate of schizophrenics (in this case) is maximal. More recently, Roger (1977) has noted difficulties in applying Edwards' method to small numbers of observations and has devised a more sensitive alternative.

For each of the three schizophrenic populations reported in the original study, total monthly births were divided by the mean monthly seasonal indices of total live births for the years 1939–1971 (OPCS, 1971) (ideally, mean indices should have been calculated for the period 1936–1960, which covered the years of birth of 75 per cent of the total schizophrenic sample, but data were not available before 1939). This step corrects the original data for seasonal bias in monthly birthrate in the population as a whole, i.e. had the original schizophrenic groups constituted representative samples of the normal population of England and Wales in terms of season of birth, seasonal variations ought not to have been detected in the corrected data.

TABLE

Variation in season of birth of schizophrenics of different genetic risk. The SCZ group had first or second degree relatives with schizophrenia, the APD group had similar relatives with any psychiatric diagnosis

Group	N	Seasonal variation in birthrate*	Peak month of birth†
Low genetic risk	598	$0.025 > p > 0.01$	October
High genetic risk			
APD	377	$0.025 > p > 0.01$	May
SCZ	92	$0.3 > p > 0.2$	April-May

* The probability that the observed trends in corrected monthly birthrates could have arisen by chance, assessed according to Roger (1977).

† Calculated according to Edwards (1961).

The results (Table) show that this is not the case. All three groups of schizophrenics display seasonal variations in birthrate although for the SCZ group (with first or second degree relatives with schizophrenia), this trend fell short of significance. Particularly noteworthy is the fact that the peak month of birth of this group is very similar to that of the other 'high genetic risk' group and differed by six months from the peak month of birth of the 'low genetic risk group'.

This highlights the potential differences between high and low genetic risk groups, reinforcing the need for their separate analysis. The results as presented here are not necessarily incompatible with the original analysis, which was based on a different model for seasonal variation not assuming cyclic variation. However, they serve also to illustrate the applicability of appropriate tests for cyclic variation which tend to have been underused in psychiatry as elsewhere in epidemiology.

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References

DALEN, P. (1968) Month of birth and schizophrenia. *Acta Psychiatrica Scandinavica*, **203**, 55–60.

—— (1974) *Season of Birth. A Study of Schizophrenia and Other Mental Disoreaders*. Amsterdam: Elsevier North-Holland.

EDWARDS, J. H. (1961) The recognition and estimation of cyclic trends. *Annals of Human Genetics*, **25**, 83–6.

HARE, E. H., PRICE, J. & SLATER, E. (1974) Mental disorder and season of birth: a national sample compared with the general population. *British Journal of Psychiatry*, **124**, 81–6.

ØDEGÅRD, O. (1974) Season of birth in the general population and in patients with mental disorder in Norway. *British Journal of Psychiatry*, **125**, 397–405.

OPCS (OFFICE OF POPULATION CENSUSES AND SURVEYS) (1971) *Registrar General's Statistical Review of England and Wales, 1967. Part III: Commentary*. London: HMSO.

ROGER, J. H. (1977) A significance test for cyclic trends in incidence data. *Biometrika*, **64**, 152–5.

PSYCHIATRIC MORBIDITY AND CIRCADIAN RHYTHMS

DEAR SIR,

In their elegant assessment of psychiatric morbidity and time zone changes, Jauhar and Weller (*Journal*, March 1982, **140**, 231–35) show that most hypomanic cases (10/15) had flown eastwards, and all depressive cases (8) had flown westwards.

In addition to earlier known facts, with regard to the effects of drugs on affective disorders, and the relation between affective disorders and circadian rhythms (Pflug, 1978), this makes it possible to add the effects of time zone changes on mood.

Flying east reduces the day below the ordinary 24 hours (when departure is in the evening and arrival in the morning, the real dark period is usually less than an hour, so that the night often becomes totally omitted). Flying east also means a phase advance in the sleep-wake cycle. Elevated mood (hypomania) was the result in 10 patients (*ibid.*). A phase advance in the