Treatment of Asthmatic Children with Steroids

Steroid aerosols have revolutionized the treatment of severely asthmatic children. Several trials, many of them well controlled have shown their value, and few important side effects have been noticed so far.1-3 Nevertheless, steroids were applied to the skin for many years before atrophic changes were reported,4-6 and we have little information on the long-term effects of topical steroids on the human lung. Nor do we know enough about the response to bacterial or viral infection in lungs treated for long periods with topical steroids: there is good evidence that candidiasis of the throat and larynx are more common in patients treated in this way.7 Pulmonary candidiasis has not been reported, however, and such hypothetical dangers must be set against the very real handicap to the chronic asthmatic of persistent loss of schooling, impaired growth and general health, and the dangers of life-threatening acute attacks.

The child with asthma should be treated in the first place with adequate bronchodilator therapy (such as salbutamol) given early in the course of any acute wheezing attacks; in effect this means that the parents should be given a supply to use on their own initiative. If this fails to give adequate control regular prophylactic disodium cromoglycate should be prescribed in addition. The standard of control demanded of this regimen is that growth in height and weight should be normal, acute attacks of wheezing should be quickly controlled, bursts of activity such as a game of football should not precipitate incapacitating shortness of breath, and there should be no significant loss of schooling. If these criteria are not fully met then steroid therapy in one form or another should be considered. There is little point in prescribing a drug which cannot be taken, and in most cases 5 to 6 years is the lower limit for effective use of aerosol inhalers. The technique must be carefully demonstrated to the child and his parents, and it is essential that the child is seen again with his aerosol a few weeks later to check that he is using it effectively. The recommended dosage is 100 μg (2 puffs) of beclomethasone dipropionate three to four times daily or 200 μg (2 puffs) of betamethasone valerate three to four times daily, both of which appear to be equally effective; possibly the intelligent patient should be encouraged to adjust this dose according to his needs. The improved quality of life in many children whose asthma has been inadequately controlled by other means is encouraging.

Use of systemic steroids, with their inherent danger of growth retardation and adrenal suppression, should have declined markedly since most patients who previously needed these drugs can be successfully weaned onto steroid aerosols. For long-term use they should be confined to the rare patient whose asthma is not controlled with steroid inhalers or the small child who cannot use them.

The preschool child with severe asthma is in a class of his own as regards difficulty of management. The indications for the use of systemic steroids should be chronic asthma causing failure of adequate growth, recurrent severe wheezing attacks causing frequent domestic derangement, or severe life-threatening acute attacks. In such a child ACTH given by injection two or three times weekly may give effective control of his asthma without impairing his growth.8 If these injections are not practicable then the only alternative is continuous oral steroid therapy, and this must be regarded as treatment of the last resort. If steroids are used in this way it is essential that growth is carefully monitored, that patients are seen regularly and not lost to follow-up, and that the drugs are discontinued at the earliest opportunity. Alternate day steroid dosage may possibly give adequate control with less impairment of growth than daily dosage. The parents of a young child requiring ACTH or oral steroids may become demoralized to see their child requiring such intensive therapy at such an early age, and it is essential to point out that such treatment is temporary and that control of his asthma should become much more effective as he becomes older and able to cooperate with other forms of therapy.

An alternative form of treatment in the young asthmatic prone to severe acute attacks is the use of short doses of oral steroids given as necessary. The parent can be given a supply of prednisone with written instructions to use a short course of, say, 30 mg per day for two or three days tailed off rapidly over a further two or three days if an acute attack of asthma fails to respond quickly to adequate bronchodilator therapy. This approach must be used only when the parents are intelligent, understand the dangers of long-term steroids, and are in frequent communication with the prescribing doctor, preferably by telephone. It is essential that a diary is kept to include all details of drug dosage related to symptoms, that this is scrutinized regularly and that growth, height, lung function, and general health are regularly checked.

In spite of the well-known dangers of long-term steroids in childhood asthma there should be no hesitation in using them in acute severe attacks. Here the indications are that the child fails to respond rapidly to intravenous fluids, bronchodilators, and treatment of any underlying infection. Since steroids inevitably take a few hours to become fully effective there is
Antenatal Diagnosis of Spina Bifida

The antenatal diagnosis of spina bifida cystica can now be made by the measurement of alpha-fetoprotein (AFP) in amniotic fluid. Though only about 25 AFP assays in amniotic fluid have been reported from pregnancies with spina bifida, in all cases with "open" lesions (exposure of neural tube to amniotic fluid) the AFP was above the highest normal value for the gestational age, usually by a substantial margin.1-7 Anencephaly produced similarly high values, but closed spina bifida lesions, which account for about 15% of all cases,8 have been reported with normal levels. AFP is synthesized by the fetal liver and yolk sac,9 10 but the route by which it reaches the amniotic fluid is not known.

The specificity of amniotic fluid AFP measurement during the second trimester of pregnancy for the diagnosis of anencephaly and spina bifida has not been precisely determined. On present evidence false-positive results seem to be relatively rare. Occasional levels are high in cases of fetal death.11 High levels have been reported in cases of Turner's syndrome in which amniotic fluid was obtained from the products of conception after spontaneous abortion,12 though in one case tested in utero13 the level was only slightly raised.

Other methods of antenatal diagnosis have been described. Direct inspection of the fetus through a fibroptic telescope has been tried but largely abandoned.14 A single case of occipital meningocele was detected by ultrasound scanning of a fetus at 16 weeks gestation,15 but the technique is time-consuming and difficult; its value still has to be established in routine practice. More recent diagnostic methods, such as measurement of beta-trace protein (a cerebrospinal fluid protein) in amniotic fluid16 or the macrophage content of amniotic fluid cells,17 have not yet been evaluated.

The diagnosis of spina bifida in the first half of pregnancy requires amniocentesis. Clearly this is not practical for screening the general population, though it is useful for screening women who have previously had one or more infants with a neural tube defect, since the risk of recurrence is about 1 in 20 after the first affected child and about 1 in 10 after the second.18 The increased risks of spina bifida associated with other factors such as poor social circumstances or residence in areas with a high incidence of the disorder are too small alone to justify routine amniocentesis.

Over 90% of infants with spina bifida are, however, born to women who have not previously had affected children, and for these another method of screening is needed. Though initial reports were discouraging,18 19 it has now been established that a high maternal serum AFP in early pregnancy is commonly associated with spina bifida and anencephaly.20 21 Screening all pregnant women by measurement of the serum level of AFP is, therefore, now possible—given the laboratory facilities—and should be followed in patients with high levels by ultrasonography to detect anencephaly and to exclude multiple pregnancy,22 and by amniocentesis to detect open spina bifida.

In Edinburgh and Oxford 27 mothers with fetuses affected by both types of spina bifida cystica (open and closed) have had their serum levels measured between 14 and 21 weeks gestation, and one-third had levels above the 98th percentile.23 Some centres are already undertaking antenatal screening on a pilot basis, and a few pregnancies with spina bifida have been terminated. However, many of the practical and ethical problems associated with antenatal screening and selective abortion after amniocentesis are unsolved.24 25 The timing of the AFP measurement for optimal discrimination between affected and unaffected pregnancies is not yet known. The risks of amniocentesis have not yet been fully quantified, and it is not known how high the maternal serum AFP must be before these risks will be outweighed by the possible benefits of interrupting a pregnancy with spina bifida. This decision is of some importance, since the number of amniocenteses performed will substantially exceed the number of potentially viable infants detected with spina bifida. If amniocentesis is restricted to the 2% of singleton pregnancies with the highest maternal serum AFP levels, 1 in 20 will have a fetus with spina bifida without anencephaly and a further 1 in 20 will have one with anencephaly. The risk in this group is thus higher than that in patients with a previously affected child, where amniocentesis is already considered acceptable. In Britain, with nearly 800,000 births a year, such screening would lead to an annual total of 16,000 amniocenteses and might detect about one-third of the 2400 infants with spina bifida. About half of these die at or shortly after birth,26 but of the remainder who survive only about a quarter are ambulant, continent, and free from mental handicap.

It is a major advance to be able to identify and offer to terminate 800 pregnancies with spina bifida each year, 300 of which would result in children who grew up seriously handicapped. Unless the risks of amniocentesis in the second trimester of pregnancy prove to be unexpectedly high, general antenatal screening for spina bifida may now be seriously considered.

8 Laurence, K. M., Lancet, 1974, 1, 301.