

**Clinical features.** Regurgitation of undigested food usually begins within weeks or months of birth and choking often accompanies feeding. Difficulties may start when solid food is started or a foreign body is swallowed. Barium swallow shows segmental stenosis clearly, webs less so. It is essential to exclude the much commoner hiatus hernia with gastro-oesophageal reflux and oesophagitis (Dunbar, 1958).

**Treatment.** Membranous stenoses have often been dilated up or torn open by the beak of an oesophago-scope (Abel, 1928). Lower oesophageal webs often need resection, as do stenoses due to tracheo-bronchial remnants. Various procedures have been tried for segmental stenosis. Gross (1953) favoured repeated dilatation and gave one of his patients 91 anaesthetics to do this. Bouginage over a swallowed thread has been much favoured, and Ravitch (1962) suggested using a bead tied into a continuous thread loop, as we have done, though he found only a few dilatations were needed. Our experience of the failure of weekly dilatations led us to try a longer period of daily dilatation, and in fact it was 4 weeks before our patient fed normally. Dilatations were easily continued at home and proved safe and easy. The frequency of dilatation was gradually reduced and the effect assessed before removing the thread loop. Some surgeons advise thoracotomy and resection if a few dilatations have proved ineffective (Swenson, 1969), but the resilient nature of the stricture leads us to recommend perseverance with outpatient daily dilatation.

### Summary

A case of congenital oesophageal stenosis presenting shortly after birth is reported. Treatment by daily dilatation with a bead on a continuous thread loop was carried on at home over several months. This proved to be a simple, safe, and effective treatment.

We thank Mr. T. McKay of the Dental Laboratory, Aberdeen Royal Infirmary, who made the acrylic beads.

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## Lack of effect of phototherapy on plasma cyclic-AMP in newborn infants

It is generally accepted that phototherapy is an effective means of lowering serum bilirubin levels in jaundiced newborn infants (Behrman, 1974). The mechanism by which phototherapy reduces bilirubin is not fully understood. In the human infants receiving phototherapy, bilirubin undergoes decomposition to a series of derivatives that are water soluble, and the plasma becomes progressively less yellow. These derivatives are not retained in the body, but are rapidly excreted in the bile and urine (Callahan *et al.*, 1970). The use of phototherapy for the treatment of hyperbilirubinaemia has an exciting and more general implication. If light can be used to speed the destruction of bilirubin, it seems not unlikely that light exposure will eventually be shown to influence plasma levels of other compounds. Light may be beneficial in many more situations than are now apparent, but it may also impair human health by destroying essential compounds or by generating toxic ones. The possibility that light may have effects on cellular activities needs to be investigated.

This study was carried out to determine whether plasma cyclic-AMP concentrations are altered in infants receiving phototherapy.

### Material and methods

Ten newborns (6 males, 4 females) undergoing phototherapy were studied. Gestational ages ranged from 34 to 42 weeks and birthweights from 2500 g

Table Mean values  $\pm$  SD of serum indirect bilirubin and plasma cyclic-AMP before, during, and after phototherapy

No. of cases	Gestational age (w)	Indirect bilirubin (mg/ml)			Plasma cAMP levels (pmol/ml)		
		Pre-	During	Post	Pre-	During	Post
10	37-80	19.26	17.54	13.27	29	27.8	26.6
$\pm$ SD	2.08	2.50	3.01	1.61	6.87	7.58	7.22

to 4500 g. All infants had idiopathic neonatal jaundice, except one, who had glucose-6-phosphatase deficiency. Before any treatment was undertaken, measurements of serum indirect-acting bilirubin, and adenosine-3', 5'-monophosphate (cyclic-AMP) levels were performed as described below. The patients were 28 to 104 hours of age at the time of these initial measurements. Cyclic-AMP and bilirubin were measured a second time at 16 to 48 hours after the start of phototherapy (mean 34 hours). In 5 of the 10 patients the measurements of cyclic-AMP were repeated 24 hours after discontinuation of phototherapy. Phototherapy was given by four 30 watt fluorescent lamps mounted on a shelf 50 cm above the bed surface.

Total and direct bilirubin concentration were measured by the Martinek (1966) micromodification of the Malloy and Evelyn technique. Plasma cyclic-AMP was determined according to the method described by Tsang *et al.*, (1972) with few modifications. 2 ml blood was drawn in a heparinized plastic syringe and mixed with 2 mg theophylline, before collecting the plasma by centrifugation. The plasma was stored at  $-40^{\circ}\text{C}$  until assayed. We used 4 volumes of ethanol to precipitate the proteins, then evaporated the clean supernatant, and redissolved it in 0.5 ml of 0.05 mol/l acetic acid, followed by three extractions with ether. The water layer was collected, evaporated, and dissolved in 0.4 ml of 0.05 mol/l acetate buffer, pH 4.5, and a sample of 0.1 ml assayed in triplicate for cyclic-AMP, using millipore filters (Tsang *et al.* 1972).

### Results and discussion

As shown in the Table the levels of plasma cyclic-AMP did not change significantly during the phototherapy. In 5 patients on whom measurements were made 24 hours after stopping phototherapy the cyclic-AMP did not change, while serum indirect bilirubin levels fell significantly (Table).

We suggested that phototherapy could change the intracellular concentrations of cyclic-AMP if the breakdown product, and/or phototherapy itself, influences the human cells. Cyclic-AMP can escape from cells into plasma; changes therefore in plasma concentrations of cyclic-AMP may reflect alterations

in intracellular concentrations (Broadus *et al.* 1970).

The mechanism of bilirubin degradation during phototherapy is a process of photo-oxidation (Callahan *et al.* 1970). The chemical nature and biological effects of the photo-oxidation products are incompletely characterized, a fact that is of primary importance in the discussion of possible side effects of this treatment. Infants receiving phototherapy may have increased insensible water loss, peripheral skin blood flow, and heat loss (Lucey, 1972).

### Summary

The effect of phototherapy on plasma cyclic-AMP in newborn infants has been studied. Our results suggest that phototherapy does not produce appreciable changes in plasma cyclic-AMP levels.

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