pericardium suggests that a serum potassium level below 6.5 mEq./l. in uremia requires no extraordinary therapeutic measures, and none was applied in this instance. Glucose was administered in daily doses of 150 g. or more.

Also illustrated is the mild hypokalemia which this patient developed during the post-oliguric phase. This was attributed to potassium depletion brought about by small daily urine losses—some of which are noted in Fig. 5—extending over a three-week period in the absence of potassium intake. The serum level soon returned to normal when potassium chloride was given orally. Slight potassium depletion was probably already present when the serum concentration reached 6.2 mEq./l. on the 14th day of the illness. The hyperkalemia of uremia may be dependent on abnormal potassium leakage from body cells damaged by the uremic process.

This patient’s diuretic phase was not associated with the large losses of water, sodium or potassium sometimes encountered. Care was taken, however, to prescribe water and sodium chloride each day in accordance with the previous day’s output and signs or symptoms of fluid or electrolyte disturbance. This was considered necessary because at this stage the new renal tubular cells have very limited ability to adjust the urine volume or composition to the body’s needs.

The patient’s signs and symptoms rapidly improved with the exception of a failure to regain the substantial weight loss. On the 32nd day of her illness the hemoglobin was only 7.1 g. %, and 1000 c.c. of blood was transfused with the hope of speeding her convalescence. She was discharged two days later with no dietary restriction.

The patient was seen again six weeks later. At that time the urine specific gravity was 1.020; no albumin or abnormal microscopic elements were found, and the blood urea nitrogen level was normal. She was still undernourished and anemic, however, and had developed an apparently unrelated arthritis of the left hip joint. It seemed probable that no significant permanent renal damage had resulted from her stormy illness.

**Summary and Conclusions**

A case of acute tubular necrosis has been reported to illustrate the management of certain complications and to record some effects of inducing a 10° F. drop in temperature in the treatment of hyperpyrexia.

Overhydration, a frequently lethal but preventable complication, was gradually controlled by limiting fluid intake to small volumes of 50% glucose intravenously.

Studies with radioactive sodium indicated a normal total body sodium content at a time when the serum sodium concentration was reduced (126 mEq./l.). This illustrates the limited value of the serum sodium determination as an indicator of the need for sodium administration.

Severe uremia was not associated with sufficient hyperkalemia (6.2 mEq./l.) to require therapeutic measures other than 300 c.c. of 50% glucose daily.

As both the use of peritoneal lavage and the artificial kidney were contra-indicated in this case, a 6.5 litre exchange transfusion was carried out. This resulted in very little clinical or biochemical improvement.

Controlled reduction of body temperature to 95° F., along with the administration of intravenous chlorpromazine and promethazine, probably resulted in a desirable reduction of urea production by the body without preventing renal tubular repair or the transition to the diuretic phase of the illness. Published reports indicate, however, that, for the normal human kidney, a greater reduction of body temperature results in a lowering of the glomerular filtration rate, renal plasma flow\(^1\) and maximal tubular excretory capacity.\(^2\)

Establishment of the diuretic phase was associated with a drop in the rate of urea production to subnormal levels. This phenomenon was responsible for the rapid drop in blood urea nitrogen concentration observed soon after diuresis began.

**References**


**SHORT COMMUNICATIONS**

**THE USE OF PROMETHAZINE AS A LOCAL ANÆSTHETIC**

FREDERICK KALZ, M.D. and ZOLTAN FEKETE, M.D., Montreal

The analgesic properties of antihistaminic drugs have been known since their introduction, and Halpern has shown as early as 1947, that (10-2-dimethyl amino-1-propyl) phenothiazine hydrochloride known as promethazine displayed an analgesic effect on the rabbit cornea three times stronger than that of cocaine. Recently the analgesic effect of 11 antihistaminic preparations was compared with their antihistaminic and anticholinergic properties, and no direct correlation was observed.\(^2\) The same authors compared the effect of six commonly used anaesthetic compounds with the same antihistaminic preparations and found that the margin of safety, expressed in the therapeutic index, was highest with promethazine, which in this particular experimental setting surpassed the analgesic effect of procaine hydrochloride over 20 times, if used as subcutaneous injection.

Several reports on the use of promethazine as a surface analgesic have been published,\(^3-5\) but it appears that the practical use of antihistamines for the purpose of local anaesthesia has never become popular. One of us (F.K.) has been using

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TABLE I.

<table>
<thead>
<tr>
<th>Time</th>
<th>Procaine 1 ml.</th>
<th>Promethazine 1 ml.</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>1%</td>
<td>2.5%</td>
</tr>
<tr>
<td>30 seconds</td>
<td>Onset of anas.</td>
<td>Onset of anas.</td>
</tr>
<tr>
<td>1 minute</td>
<td>Partial anas.</td>
<td>Partial anas.</td>
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<td>3</td>
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<td>4</td>
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<tr>
<td>10</td>
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<td>20</td>
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<td>**</td>
</tr>
<tr>
<td>30</td>
<td>**</td>
<td>**</td>
</tr>
<tr>
<td>50</td>
<td>No anas.</td>
<td>No anas.</td>
</tr>
</tbody>
</table>

Anas. = anaesthesia.
* = There was some hypesthesia, not deep enough for performing any surgical procedures.

promethazine for several years as a local anaesthetic in patients known to be intolerant to procaine or other members of the "caine" group. No untoward reactions have been observed.

Lately we have investigated the properties of this preparation more closely. In seven human volunteers the onset, degree and duration of local anaesthesia produced by subcutaneous injections of procaine and of promethazine were compared. Identical results were observed in all cases.

Table I shows that the anaesthetic effect of 2.5% of promethazine roughly equals that of 1% procaine; weaker concentrations tend to be slower in onset.

In addition, promethazine was used in 30 minor surgical interventions, injected subcutaneously in concentrations ranging from 1.25% to 2.5% and in amounts of 0.5 to 2.0 ml.

The following procedures have been performed under this form of local anaesthesia:
1. Biopsies, using scalp knife and suture.
2. Biopsies, using a circular punch.
3. Excision of cutaneous tumours, including basal cell carcinomas, keratoacanthomas, and one malignant melanoma.
4. Electrosurgery, including two cases of radical excision of basal cell tumour with the loop, desiccation of warts and keratoses, and coagulation of xanthomas on the eyelids.
5. Curettage of warts, including sites on soles and fingers.

Satisfactory anaesthesia was obtained in all patients when 2.5% solutions were used, including those in whom electrosurgery was used or plantar warts were removed, both procedures requiring complete anaesthesia. Patients sensitive to procaine tolerated promethazine well and no untoward reactions either locally or generally were seen in this series. Promethazine should not be used for intradermal injections; concentrations of 2.5% cause marked tissue reaction and necrosis.

No amounts larger than 2 c.c. were given in this series. A general sedative effect should be anticipated with larger dosage.

**SUMMARY**

The literature on the local anaesthetic effect of antihistaminics is reviewed. Promethazine is a powerful local anaesthetic, suitable particularly for patients with known or suspected sensitivity to drugs of the procaine group and for patients with a history of multiple drug intolerance. Injections must be given subcutaneously since intradermal application causes necrosis.

The promethazine was supplied by Poulec Frères as Phenergan.

**REFERENCES**


**CHRONIC LYMPHÆDEMA**

CHARLES S. KILGOUR, M.D., Toronto

Chronic lymphædeema of a part of the body, usually an extremity, is a swelling due to imperfect drainage of lymph from the tissues.

The causes of this condition are often unknown. Idiopathic lymphædeema is usually congenital and called lymphædeema precox or Milroy's disease. It may follow obstruction of the lymphatics owing to scar formation, malignant growth or parasites.

In considering treatment, we must distinguishædeema from medical causes or venous thrombosis from this condition.

Operations for chronic lymphædeema are of two types. The first is "physiological" to establish new drainage, such as the Kondoleon or Gillies procedures. In the Kondoleon procedure, the deep fascia of the involved area is excised with the hope of establishing lymphatic drainage from the super-

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