

The Injection Treatment of Stress Incontinence

BY

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THE injection of sclerosing solutions has for some years been used as a method of treatment in ailments such as varicose veins, hydrocele, ganglion and inguinal hernia, the irritant solution stimulating the formation of fibrous tissue.

Successful reports of this method in cases of inguinal hernia has prompted its trial for stress incontinence in patients who present varying degrees of anterior vaginal wall prolapse and in whom the main symptom is inability to hold water on coughing or straining.

Patients are commonly met with in gynaecological clinics who with a degree of prolapse, too slight to warrant operation *per se*, require some effective treatment for their stress incontinence.

In reviewing the literature I cannot find any report of the use of sclerosing fluids in stress incontinence, although urethroceles have thus been treated. Gersuny¹ reported a case of fistula which he successfully treated by injecting paraffin. The method, however, does not seem to have been continued.

In this first series of 20 cases a fair degree of success has been met with. For classification cases have been divided into first, second and third degrees according to the severity of the anterior vaginal wall prolapse.

Degree 1 Cases.

The patients in this class had a very slight degree of prolapse affecting the lower part of the anterior vaginal wall, where the skin is baggy, wrinkled and thickened over the urethra. In most of these patients a sound can be passed along the urethra upwards and backwards, and there is not any sign of a urethrocele.

Degree 2 Cases.

The patients in this class had, on straining, definite prolapse of the anterior vaginal wall.

Degree 3 Cases.

The patients in this class had a moderate descent of the anterior vaginal wall with some slight descent of the cervix, usually described as first stage of prolapse.

As might be expected, the results of the treatment by injection are more successful the less the degree of prolapse of the anterior vaginal wall.

ANATOMY AND MECHANICS OF STRESS INCONTINENCE.

It is not clearly understood upon what factors normal continence depends, but it is probably a combined action of the following anatomical structures:—

(1) *The external closing mechanism*, sometimes called *the hiatus urogenitalis*, is probably the most important factor. This combination of muscle and fascia surrounding the urethra depends to a great extent for efficient action on the underlying support which in average cases of prolapse is lacking.

(2) *The compressor urethrae muscle*. This is sometimes called the external sphincter, but it is not really a true sphincter. It is formed of striated muscle and lies between the layers of the urogenital diaphragm forming a cuff-shaped tunnel round the urethra.

(3) *The trigonal sphincter*. This is a group of muscle fibres forming a sling round the anterior wall of the urethra. It is doubtful whether, either functionally or anatomically, it can be distinguished from the compressor urethrae muscle.

(4) *Sphincter vesicae*. This structure is the circular muscle coat of the upper portion of the urethra and not anatomically demonstrable as an orbicular sphincter. That the sphincter vesicae is of undoubted functional importance is proved by resistance to the passage of a sound upwards and to pressure downwards when a patient with opaque fluid in the bladder is screened in the act of straining as if micturating.

Injury to this system of musculature is most commonly caused by compression of the structures during parturition between the symphysis pubis and the foetal head or the obstetric forceps. The muscles of the urethral wall and the compressor urethrae are probably most commonly injured with consequent weakening, stretching and gradual loss of contractile power. At the same time perineal laceration and stretching of the vaginal outlet weaken the support for the external closing mechanism to function properly.

Urinary incontinence gradually develops, usually after a

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period of years, sometimes associated with prolapse of the anterior vaginal wall. The damaged muscle tissue cannot be restored, but support for the external closing mechanism can be supplied by removal of a small piece of the anterior vaginal wall or the buttress operation described by Berkeley and Bonney.² The final result of the operation is to supply some hard scar tissue as a support for the external closing mechanism to act on.

An attempt has here been made to supply some support of fibrous tissue by injecting a sclerosing solution.

TECHNIQUE OF THE INJECTION.

The fluid used in all cases is a 5 per cent solution of sodium morrhuate. Since the treatment was purely experimental the quantity injected and the technique varied slightly in different cases. In the earlier cases larger quantities were given at one injection but experience showed that repeated smaller injections gave a better result. At first light anaesthesia was used but this was soon discarded as unnecessary, the injections causing surprisingly little pain.

The following technique was found to be the most suitable in the majority of cases. The lithotomy position is advisable, but not essential. The exposure of the urethral orifice and lower vaginal wall is more complete in this position and greatly facilitates the injections, especially at the first treatment. Later, injections may be made in a lateral position as the site of the last injections can usually be ascertained by hardening or ulcer-formation. The labia are separated with the finger and thumb of the left hand and the site of the injection cleaned with some mild antiseptic such as 1 in 1,000 biniodide of mercury. A 5 c.c. record syringe is used with a fine needle. The urethral orifice is inspected and such conditions as chronic urethritis, prolapse and caruncle excluded. A bladder sound is now passed into the urethra to ascertain its direction and to exclude the existence of a true urethrocele. At the first injection 1 c.c. of solution is given beneath the skin of the vaginal wall in the midline just above the urethral orifice. The plunger should be slightly withdrawn before the injection to make sure that a blood-vessel is not pierced. The second injection is given a week later, and consists of two injections, first 1 c.c. of solution is injected at the same site as before, and, second, a para-urethral injection is given, $\frac{1}{2}$ c.c. being injected beneath the skin to either side of the urethral orifice.

The patient is seen again in 14 days when a further injection of 2 c.c. of the solution is given in the midline $\frac{1}{4}$ inch above the site of the first injection, provided the symptoms still persist and the vaginal wall has not sloughed. The injections are now repeated at intervals of 14 days until the symptoms are cured. It is recommended that not more than 2 c.c. of the solution be used at a time and that not more than $\frac{1}{2}$ c.c. be injected at either side of the urethra. Hardening round the lower part of the vaginal wall and urethral orifice is usually felt if the patient be examined at an interval after the second treatment.

SEPARATION OF A SLOUGH.

In most cases it is found that a slough measuring a $\frac{1}{4}$ inch in diameter will separate in the midline after the second or third injection. In these cases further injections are not given until the ulcer has healed, and by this time, in many cases, the symptoms of stress incontinence will be found to have disappeared and further treatment will not be necessary. It was generally found that better results were obtained in those cases in which a slough separated, due no doubt to the contraction of the resulting scar tissue. In all cases the separation of the slough and the resulting ulcer were completely painless, the only complaint of the patient being occasionally a slight brown discharge which usually lasted 3 to 4 days.

USE OF A RING PESSARY.

In cases in which there was any marked degree of prolapse of the anterior vaginal wall a ring pessary was inserted after the first injection and left in position until the treatment was finished, to support the vaginal walls during fibrosis or healing of the ulcer after separation of the slough. In cases in which there was any marked prolapse the general result obtained was not good.

REVIEW OF CASES.

Twenty patients in all have been treated. Of these 12, or 60 per cent, were completely cured. In none of these patients has stress incontinence recurred within 12 months. Five patients, or 25 per cent, showed marked improvement, i.e., urine was voided only on severe coughing or straining, and they were comfortable compared with their previous condition. The injections in these cases were usually stopped at the patient's request because they thought that the relief they had obtained was sufficient. Three patients, or 15 per cent, did not show any improvement. Two of these were cured by operation.

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A section of the piece of vaginal wall removed from the patients operated upon showed considerable thickening and fibrosis of the subcutaneous tissues. All the patients treated had borne 1 or more children and in most there was a history of a long and difficult labour, completed by the delivery of a large baby with the forceps was obtainable. Although the damage to the tissues is undoubtedly acquired during parturition it is noteworthy that in the majority of patients symptoms of stress incontinence appear only after a lapse of several years. This delay is probably due to the gradual stretching of the tissues and the development of an anterior vaginal wall prolapse which is especially prone to occur about the time of the menopause. The duration of symptoms before relief was sought varied from 4 weeks to 2 years and the better results from those cases of short duration may be seen from the table.

The number of injections necessary for cure varied from 1 to 7. In some patients signs of improvement were late in appearing, and in these the long period necessary for treatment made the patients tired of attending while their symptoms failed to improve. In 2 cases complete cure was obtained 1 week after the first injection. Sloughing of the anterior vaginal wall occurred in 12, or 60 per cent, of cases, and was a good sign as regards prognosis of the end result. Of the 12 patients in whom a slough was produced by the injection 75 per cent were cured. In 2 patients symptoms of stress incontinence had recurred following a repair operation for prolapse. In neither patient was there any sign of recurrence of the prolapse, and both were cured by the injection treatment.

DANGERS.

1. *Sloughing of the urethra.* Since a slough of the anterior vaginal wall is produced in the majority of cases it seems possible that a slough of the urethra might occur. This accident did not happen in any case in this small series. To produce a urethral slough it would probably be necessary to inject the fluid into the urethral wall. This can always be avoided if a sound is passed to ascertain the position of the urethra before the injection is made.

2. *Collapse following injection.* Following the injections of 5 per cent morrhuate for varicose veins, cases of oversensitivity and collapse have been reported. M. L. Dale³ reports the case of a patient who had a severe general reaction signified by bradycardia, cyanosis and coma. The patient recovered after

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TABLE OF CASES.

Case	Age	Duration of symptoms	No. of children	Age of youngest	No. of injections	Total No. of c.c. given	Sloughing of ant. vaginal wall	Degree of lower ant. vaginal wall prolapse	Result
1	35	2 years	1	2½	1	2	No	I	Cured.
2	48	4 weeks	1	12	4	6½	Yes	II	Cured.
3	35	1 year	2	6	5	9	No	III	No improvement. Cured by operation.
4	32	1½ years	3	1½	4	6	Yes	II	Improved after 1 injection. Symptoms recurred. Lost trace of.
5	56	3 months	8	8	4	8	Yes	II	Cured.
6	41	2 years	3	9	4	10	Yes	II	No improvement
7	35	3 months	1	10	6	12.5	Yes	II	Cured.
8	66	3 months	7	27	1	4	No	II	Cured.
9	44	1 year	5	2	1	4	No	II	Improved. Lost touch with.
10	58	2 years	3	22	4	12	Yes	III	Cured.
11	40	3 months	2	12	2	3	Yes	I	Cured.
12	55	6 months	9	27	1	1	No	I	Cured.
13	35	4 years	2	3½	1	2	Yes	I	Cured.
14	62	1 year	1	25	3	2	Yes	I	Cured.
15	31	6 years	2	6	1	2	No	II	No improvement. Lost trace of.
16	35	3 years	2	3½	1	2	Yes	I	Cured.
17	59	6 months	4	20	7	8	Yes	II	Improved.
18	60	1 year	2	30	2	3.5	No	II	Improved.
19	43	7 years	1	7	2	3	Yes	II	Cured.
20	52	5 years	2	17	2	3	No	II	Improved.

injection of epinephrine m. 10. K. N. Lewis⁴ reports a similar case following an injection of 1.5 c.c. of solution. This patient had had a course of sodium morrhuate injections 3 years previously. L. L. Praver⁵ contends that cutaneous and nitritoid reactions follow administration of 5 per cent solution in 3 per cent of cases. There was not any sign of general or local reaction in any patient in this series.

3. *Stricture of the urethra.* It seems possible that further treatment by this method might produce urethral stricture. There was not, however, in any patient a sign of such a complication. It is common knowledge how difficult it is when operating to produce a permanent urethral stricture in the female, and it seems unlikely that this method should do so.

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SUMMARY.

(1) Twenty patients suffering from stress incontinence following parturition have been treated by injections of sodium morrhuate solution.

(2) Most patients had varying degrees of anterior vaginal wall prolapse. Patients with only slight degrees of prolapse, or none at all, have the best chance of cure by this method.

(3) A slough of the anterior vaginal wall separates in the majority of the cases treated, and this seems to favour a good end result.

(4) Dangers of injecting this sclerosing solution are (a) sloughing of the urethra, (b) collapse following the injections, (c) urethral stricture. These complications did not result in any of the patients treated.

(5) The cure-rate in these patients was 60 per cent. The cure-rate in such patients operated upon is probably in the region of 98 per cent. In some cases an additional disadvantage to the injection method is the long period necessary for treatment.

CONCLUSIONS.

The injection method should prove useful in cases in which (1) Stress incontinence following parturition exists without prolapse or with a very slight degree of prolapse, (2) stress incontinence recurs following repair of a prolapse without recurrence of the prolapse, and (3) old patients, and in patients in whom it is especially desirable to avoid operation.

Further trial of the method with different sclerosing fluids and alterations to the technique may improve the value of the method.

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