

## Temporary reappearance of sperm 12 months after vasectomy clearance

T.S. O'BRIEN, D. CRANSTON, P. ASHWIN, E. TURNER, I.Z. MacKENZIE and J. GUILLEBAUD

Elliot-Smith Clinic, Churchill Hospital, Oxford, UK

**Objectives** To determine the incidence of positive semen analysis 12 months after vasectomy clearance.

**Subjects and methods** A prospective study was undertaken, starting in 1990, of men undergoing vasectomy. Azoospermia was confirmed by two successive semen analyses 16 weeks after vasectomy. One year later a further sample was analysed for the presence of sperm.

**Results** Of 1000 men who provided a sample for analysis, six men (0.6%) have had positive semen analyses

1 year after the initial tests showed azoospermia. In all six the sperm count was <10 000 per mL. Five of the six men produced a repeat sample 1 month later which, in all five cases, showed azoospermia. No pregnancies have been reported to date.

**Conclusion** Transitory reappearance of sperm following successful vasectomy occurs in about 0.6% of men. This incidence is 18 times greater than the reported pregnancy rate following successful vasectomy.

**Keywords** Vasectomy, complications, sterilization

### Introduction

Vasectomy is the most reliable form of male contraception and world-wide around 42 million couples rely on vasectomy as their method of family planning [1]. Early failure of vasectomy was described in 1969 [2] and is usually recognized when the patient's ejaculate fails to be clear of sperm at the first semen analysis after vasectomy. Early failure is usually ascribed to technical error or early recanalization of the vas, and is reported to occur after one in every 300 vasectomies [3]. Late recanalization of the vas occurs when spermatozoa reappear in the ejaculate after two negative semen analyses. Late recanalization is thought to be a rare event [4] and generally is only suspected when the partner of a sterilized man becomes pregnant. Semen analysis at that stage will usually show numerous motile sperm, confirming recanalization, and any fears of infidelity are allayed.

At the Elliot-Smith Clinic between 1970 and 1993 approximately 26 500 vasectomies have been performed and nine late failures, resulting in pregnancy, have been identified. In all nine cases the initial post-vasectomy semen samples showed azoospermia, but at the time of the pregnancy subsequent samples were positive.

It is not clear, however, whether the pregnancy rate accurately reflects the rate of late recanalization or whether a subgroup of men is at increased risk of this

complication. This study was designed to answer these questions.

### Subjects and methods

In 1990 a prospective study of men undergoing vasectomy was begun at the Elliot-Smith Clinic. In addition to the usual post-vasectomy samples, requested at 16 and 18 weeks, the men were asked to provide annual samples for 3 years. This paper reports on the first 1000 patients after 1 year. The vasectomies were performed under local anaesthetic using a standard technique as reported previously [3]. Briefly, this involves excision of 2–3 cm of vas, with intra-luminal diathermy to the vasal stumps. Fascial interposition and vasal ligation were not performed. In all cases azoospermia was confirmed by two successive semen analyses following the vasectomy [5]. One year later a further sample was analysed for the presence of sperm.

### Results

One thousand men have provided a sample for analysis. Six men (0.6%) have had a positive semen analyses after 1 year. In all six the sperm count was <10 000 sperms per mL. Five of the six men produced a repeat sample 1 month later which, in all five cases, showed azoospermia. The sixth man failed to provide a sample. To date, no pregnancies in the partners of the study population have been reported.

## Discussion

This study shows that the late recanalization rate following vasectomy is at least 1 in 165 (0.6%). At the Elliot-Smith Clinic the pregnancy rate following failure of vasectomy is 1 in 2900 (0.03%). Clearly, the pregnancy rate does not reflect the late recanalization rate. It is unlikely that the high rate of late recanalization can be ascribed to a failure of the particular vasectomy technique employed at our clinic, as both the early recanalization rate and the late pregnancy rate are in keeping with other reported series [4,6]. There is only one other published prospective study of an attempt to collect annual semen specimens following vasectomy [7]. Recanalization was found to have occurred in three (1.4%) of 215 cases.

The experience of the operating surgeon did not show any association with the transitory appearance of sperm as described here. This contrasts with our experience of technical errors causing early failure of vasectomy [3], but is consistent with our experience of the cases of late recanalization of the vas in which millions of sperm appear in the ejaculate [3,4]. Equally, late achievement of azoospermia did not appear to predispose to the development of late recanalization of the vas.

In the men who had positive semen analyses, the five who produced a repeat sample one month later all had azoospermia. Transitory reappearance of sperm following vasectomy may help to explain pregnancies occurring in the partners of apparently azoospermic men who have previously undergone vasectomy. We have recently reported six such cases in which paternity was proven by DNA fingerprinting [8].

Fluctuations in the sperm count following clearance after vasectomy almost certainly mean our estimate of the frequency of recanalization is too low. Presumably, some men who were azoospermic at the time of the 1-year test might, if tested, have had a positive analysis at other times during the previous 12 months (Fig. 1).

The study continues, and we plan to analyse semen from the men at 2 and 3 years after vasectomy to see if any of the samples from other men become positive, or if pregnancies occur in the partners of any of the patients.

For the surgeon, this study reinforces the need to inform the patient that vasectomy can fail and result in a pregnancy. The study also supports a policy of further semen analyses, and even DNA fingerprinting in the rare cases when an apparently azoospermic man fathers a child after vasectomy.

## Acknowledgements

We are grateful to all the staff of the Elliot-Smith clinic for their assistance in reporting these results, and to Dr

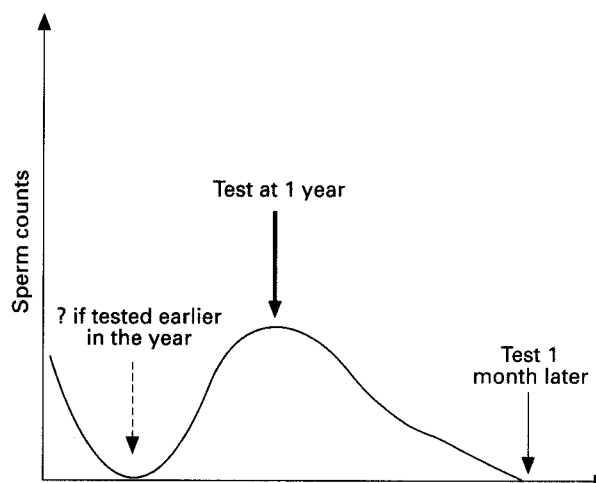


Fig. 1. Sperm counts after late recanalization of the vas.

J Selkon, Consultant Microbiologist, who organized the semen analyses. We are particularly grateful to Dr M. Altman of The Vasectomy Advancement Society for financial support.

## References

- 1 Population reports. Series D, No. 5, March 1992
- 2 Pugh RCB, Hanley HG. Spontaneous recanalization of the divided vas deferens. *Br J Urol* 1969; **41**: 340-7
- 3 Philp T, Guillebaud J, Budd D. Complications of vasectomy: review of 16 000 patients. *Br J Urol* 1984; **56**: 745-8
- 4 Philp T, Guillebaud J, Budd D. Late failure of vasectomy after two documented analyses showing azoospermic semen. *BMJ* 1984; **289**: 77-9
- 5 Davies AH, Sharp RJ, Cranston D, Mitchell RG. The Long-term outcome following special clearance after vasectomy. *Br J Urol* 1990; **66**: 211-12
- 6 Sivanesaratnam V. Vasectomy — an assessment of various techniques and the immediate and long term problems. *Br J Fam Plan* 1990; **16**: 97-100
- 7 Esho JO, Ireland GW, Cass AS. Recanalization after vasectomy. *Urology* 1974; **3**: 211-14
- 8 Smith JC, Cranston D, O'Brien T, Guillebaud J, Hindmarsh J, Turner AG. Fatherhood without apparent spermatozoa after vasectomy. *Lancet* 1994; **344**: 30

## Authors

T.S. O'Brien, FRCS, Clinic Surgeon.  
 D. Cranston, D Phil FRCS, Clinic Surgeon.  
 P. Ashwin, SRN, Sister.  
 E. Turner, SRN, Sister.  
 I.Z. MacKenzie, MD, FRCOG, Clinic Surgeon.  
 J. Guillebaud, FRCSE, FRCOG, Clinic Surgeon.  
 Correspondence: Mr D. Cranston, Elliot-Smith Clinic, Churchill Hospital, Oxford OX3 7DL, UK.

# Vasectomy by section, luminal fulguration and fascial interposition: results from 6248 cases

S.S. SCHMIDT

Department of Urology, University of California School of Medicine, San Francisco, California, USA

**Objective** To determine the incidence of complications, including recanalization, in a series of 6248 consecutive vasectomies performed with a section-fulguration-fascial interposition technique.

**Patients and methods** Over a 38-year period, 6248 vasectomies were performed by one surgeon (S.S.S.) as a clinic procedure under local anaesthesia with no resection of a vasal segment. The mucosa of the cut ends of the vas was destroyed by cauterization and the fascial sheath of the vas was interposed as a

barrier. Semen specimens were examined until two specimens, one month apart, showed no sperm.

**Results** Complications were minimal, with few cases of haematoma or wound infection. Spermatic granulomas were uncommon. No post-vasectomy pregnancies were reported and no patient showed a persistence of sperm.

**Conclusion** The section-fulguration-fascial interposition technique of vasectomy was uniformly effective, with few post-operative problems.

## Introduction

Vasectomy, the most common operation in the adult male, is used as a means of permanent contraception and, to a lesser degree, as a means of preventing the ascending infection that can cause epididymitis. It is commonly performed as an out-patient clinic procedure under local anaesthesia. Disability is usually minimal, and most patients do not require post-operative analgesia. Often done by family practitioners, the principles of the operation are often poorly understood and thus a variety of techniques is employed. Failures, defined as fertility or the persistence of sperm in the semen, continue to occur [1–8]. This report presents a series of 6248 consecutive vasectomies performed by one surgeon with one technique. Few complications occurred and there was no persistence of sperm in the semen.

With the classic vasoligation technique, a reported failure rate of 3% occurs because the vas remains patent up to the ligature [9]. When the ligated ends slough off, sperm may leak from the open lumina and either recanalization or the formation of a spermatic granuloma may follow.

Division of the vas and fulguration of the mucosal lumen of the cut ends with a heated wire can seal the cut vas because the destroyed mucosa is replaced by a plug of scar tissue [9]. The second barrier is the interposition of fascia with the sheath of the vas to prevent any sperm that escape from reaching the urethral end.

The 'no-scalpel vasectomy' is currently being advocated [10], particularly in developing countries where limited access to trained surgeons and a large population make speed important and failures (and malpractice) of minor concern. Sufficient reports of success rates and complications with that method are not available for evaluation.

## Patients and methods

The 6248 men ranged in age from 18 years (with three children) to 65 years, with the majority between 26 and 35 years.

The operation was performed in the clinic operating room using a sterile technique. No sedation was given, as the men usually drove themselves home afterwards.

Small bilateral incisions (unilateral in patients with unilateral absence of the vas; in this series, 20 patients, or 0.3%, had unilateral absence of the vas) were made in the upper scrotum after the skin and perivasal tissues had been infiltrated with plain 1% lidocaine. As the operation proceeded, additional anaesthetic was injected around the vas where the spermatic nerve runs. After the skin was opened the vas was grasped with an Allis clamp. The fascial sheath was incised and the vas freed from its surrounding tissues, cut, and the epithelium of the lumen on both sides cauterized by inserting a heated wire to a depth of 3–4 mm, leaving the muscularis viable as a source of the scar tissue that would form a plug. A segment of the vas was not excised and ligatures and clips were not used. The sheath was closed over the

Accepted for publication 4 April 1995

urethral end with a single suture. This directs the testicular end of the vas away from the spermatic nerve and vessels, protecting them should a spermatic granuloma develop. The skin was closed after inspection had shown haemostasis to be complete, and a suspensory scrotal support was applied.

The first semen sample was requested after at least 15 ejaculations. If the first showed no sperm, a second was examined 1 month later to confirm absence; half the patients complied.

## Results

### Complications

Small haematomas that subsided uneventfully developed in 17 (0.3%) of the 6248 men. An antibiotic, usually tetracycline, was given to 181 men (2.9%) of whom 2.14% had definite and 0.76% had possible infections. No patient required hospitalization and no disability resulted from infection. No cases of bacterial epididymitis occurred.

Congestive epididymitis (a self-limiting engorgement of the epididymal tubule [11]) occurred in 300 men (4.8%) and recurred in a few. In all cases, the disorder subsided uneventfully.

Spermatic granuloma of the epididymis was diagnosed in 56 men (0.9%), of whom six (10%) required epididymectomy because of pain.

The body handles leakage of sperm from the testicular end of the vas in one of three ways (alone or combined): patency may be restored, as when the vasectomy fails (spontaneous anastomosis); ductules may develop, orientated to reach the urethral end of the vas and to restore patency (vasitis nodosa); or tissue reaction may surround the sperm with a wall containing phagocytes that will ingest it (a lesion called a granuloma). When the wall of the granuloma contains a nerve filament, the result can be exquisitely painful and surgery is indicated. This spermatic granuloma of the vas need not be excised. It will cease to exist when sperm no longer enter it; thus, the fluid content should be evacuated and the vas sealed again on the testicular side. Spermatic granulomas of the vas were diagnosed in 1.36% (90) of the men and corrective surgery was carried out in half. Several were bilateral (not concurrently), several recurred and one developed into a vasocutaneous fistula. The time of occurrence varied, from a few months to 5 years after vasectomy.

The spermatic cord may become painfully swollen up to the point of the vasectomy and not beyond. This funiculitis is not a complication of the operation but a consequence of a urinary infection. Eight such cases occurred (0.13%).

In this series, 39 men complained of sexual dysfunction, usually years after the vasectomy and at an incidence comparable to that in the general male population.

Every patient was directed to apply an icebag to the scrotum after the operation to alleviate post-operative pain. Two patients requested codeine for post-operative pain but most men did not need to take any analgesics.

Failure, defined as either a pregnancy or the persistence of sperm in the semen, was not detected during follow-up.

## Conclusion

A technique involving vasal section, luminal fulguration and fascial interposition applied in 6248 consecutive patients resulted in few complications and uniform elimination of sperm in the ejaculate.

## Acknowledgement

The author is indebted to the Carl L.A. and Esther S. Schmidt Memorial Foundation.

## References

- Schmidt SS. Vasectomy (editorial). *JAMA* 1988; **259**: 3176
- Denniston GC, Kuehl L. Open-ended vasectomy. *JABFP* 1994; **7**: 285
- Raspa RF. Complications of vasectomy. *Am Fam Phys* 1993; **48**: 1264
- Edwards IS. Earlier testing after vasectomy. *Fertil Steril* 1993; **59**: 431
- Alderman PM. The lurking sperm. A review of failures in 8879 vasectomies performed by one physician. *JAMA* 1988; **59**: 3142-4
- Philp T, Guillebaud J, Budd D. Complications of vasectomy: review of 16000 patients. *Br J Urol* 1984; **56**: 745-8
- Staff of the Margaret Pyke Centre. One thousand vasectomies. *Br Med J* 1973; **4**: 216-21
- Schmidt SS. Technics and complications of elective vasectomy. The role of spermatic granuloma in spontaneous recanalization. *Fertil Steril* 1966; **17**: 467-82
- Schmidt SS, Minckler TM. The vas after vasectomy: comparison of cauterization methods. *Urology* 1992; **40**: 468-70
- Li SQ, Goldstein M, Zhu J, Huber D. The no-scalpel vasectomy. *J Urol* 1991; **145**: 341
- Schmidt SS. Anastomosis of the vas deferens. An experimental study. III. Dilatation of the vas following obstruction. *J Urol* 1959; **81**: 206-8

## Author

S.S. Schmidt, MD, Research Associate, Department of Urology, U-575, University of California, San Francisco, CA 94143-0738, USA.

**Commentary**

This impressive series of vasectomies, performed by one surgeon, is the second largest individual series in the world literature. Dr Schmidt describes his technique and has apparently had no failures, although only 50% of his patients produce follow-up semen specimens.

He comments on spermatic granuloma of the vas, saying that the patency may be restored (spontaneous anastomosis) or ductules may develop (vasitis nodosa). These seem to me to be the same thing.

This impressive series makes a powerful argument for using his technique of luminal fulguration and fascial interposition.

I think it is inadvisable to allow patients to drive themselves home after a vasectomy under local anaesthesia, for in the UK it may be difficult to defend the doctor, as the third party, in a case brought by an automobile insurance company.

J.C. SMITH, MS, FRCS  
*Consultant Urological Surgeon*

## Persistent spermatozoa after vasectomy: a survey of British urologists

J.R. BENGER, S.K. SWAMI and J.C. GINGELL

The Bristol Urological Institute, Southmead Hospital, Westbury-On-Trym, Bristol, UK

**Objectives** To determine the rate of, and main indications for, repeat vasectomy in our department, and to assist in policy-making procedures by determining how urologists in England and Wales manage those men who show small but persistent quantities of motile or non-motile spermatozoa in their ejaculate after vasectomy.

**Subjects and methods** A retrospective review of all of the vasectomies and repeat vasectomies performed by the Urology Department at Southmead Hospital during a 14-month period was undertaken to determine the rate of and indications for repeat vasectomy. Subsequently, every consultant urologist in England and Wales was canvassed with a questionnaire to determine whether they repeated vasectomy in the presence of persistent motile or non-motile sperms and if so, after what time interval. Any experience of pregnancies arising from these groups was also assessed, and any relevant comments invited.

**Results** The local review revealed that 5% of all vasectomies were repeated within 6–36 months. Of these, 87% were performed because of persistent sperms in post-vasectomy semen samples, the majority of which showed sperm concentrations of one in 50 to one in 100 high-power fields. A response of 56% was

obtained to the questionnaire and of those responding, 23% never repeated a vasectomy where there were persistent non-motile sperms, but almost all urologists would eventually repeat vasectomy where motile sperms were present. The median interval between the first and second vasectomies was 6 months and 12 months for motile and non-motile sperm, respectively. Apart from those cases already published, there was little experience of pregnancy arising from men with persistently few motile or non-motile sperms.

**Conclusions** The risk of pregnancy occurring in the presence of non-motile sperms was estimated to be less than the established risk of late recanalization, and this survey provides both logical and medico-legal support for issuing a 'special clearance' to men with few persistent non-motile sperm after vasectomy, providing the risks of pregnancy are properly discussed and documented. For motile sperm, however, there appears to be a stronger precedent for repeating the vasectomy. The technique used for post-vasectomy semen analysis was also an important consideration when determining any policy regarding such cases.

**Keywords** Vasectomy, non-motile spermatozoa, semen analysis

### Introduction

The subject of vasectomy and the subsequent risk of pregnancy where persisting sperm are present in low numbers, non-motile or even absent has been a subject of much debate and controversy amongst urologists for many years. With the advent of reliable DNA analysis, which can be used to establish paternity with almost complete certainty, it is now possible to prove that a vasectomy has failed, whereas before such reports have remained anecdotal or open to doubt. Previously, several reports have shown no pregnancies occurring where there were few persistent sperm and/or where these were non-motile [1–3], but in 1993 there was a report

of a pregnancy, supported by DNA analysis, which had occurred where the father had only non-motile sperms on subsequent analysis [4]. More remarkably, in the following year Smith *et al.* [5] reported a series of six pregnancies in which the DNA-proven fathers had no sperm detectable in the semen on repeated testing. This finding obviously has profound implications for urologists, as it suggests that not even repeated negative semen analysis can be considered a guarantee of sterility. Therefore, it is against this background, and with a constant awareness of the medico-legal implications of failed vasectomy, that urologists must determine their policies and practice.

The present study began with a review of the vasectomies performed in our department over 14 months and was undertaken because it was thought that our

rate of repeat vasectomy was in excess of the nationally accepted average. This review highlighted the clinical problem of those patients who have persistently low concentrations of sperm in their semen samples after vasectomy, and thus it was logical to determine the nationally accepted practice, as the results of such a survey could potentially provide medico-legal support for any policy decision eventually made.

Finally, we considered the laboratory methods used for post-vasectomy semen analysis and the potential effect that they might have on the clinical decisions ultimately taken.

## Subjects and methods

### *The review*

The total number of vasectomies and repeat vasectomies performed in the Department of Urology at Southmead Hospital during 14 months commencing on the 1 January 1993 were retrieved from a prospectively compiled computer database (the 'MDI' system). Because all repeated vasectomies were performed under general anaesthesia, the theatre registers for the same period were also reviewed to ensure that no repeat operations were missed. In all cases of repeated vasectomy the medical notes relating to both the original and repeat operations were retrospectively reviewed to determine several factors, the most relevant of which were the indication for a repeat operation, the results of semen analysis before this procedure and the time elapsed between the initial operation and the repeat. As repeated operations were performed up to 36 months after the initial vasectomy it was assumed that the rate of vasectomy and repeat vasectomy in our department remain approximately constant from year to year, and this was confirmed by reviewing the values available from the MDI computer database for the previous 2 years.

### *The questionnaire*

A simple questionnaire, comprising five questions and inviting any further comments, was sent to every consultant urologist in England and Wales to determine what proportion of urologists would repeat vasectomy in a case where few motile or non-motile spermatozoa were persistently present, and after what time interval such a repeat operation would be undertaken. A question was designed to determine whether there were more pregnancies resulting from non-motile or low concentrations of spermatozoa than have been reported in the literature. At the end of the questionnaire space was made available for the respondent to identify areas of particular interest or concern.

## Results

### *The review*

A total of 633 vasectomies and 31 repeat vasectomies were performed in the 14-month period, yielding a repeat rate of 4.9%. There was complete agreement between the information from the MDI computer database and the hand-written theatre registers. There was no statistically significant correlation between the likelihood of a repeat vasectomy and the grade of surgeon or the technique used at the original operation. The median interval between the original and repeat operations was 14 months, and the indications for a repeat vasectomy are listed in Table 1.

Although very sensitive, the technique of semen analysis used locally did not permit motile and non-motile sperm to be distinguished, so the 87% of cases performed because sperm were persistent were further divided into three groups (Table 2). This showed that almost half of all repeat vasectomies performed in our department were undertaken when the sperm concentration was very low (one sperm in 50 to 100 high-power fields), and that, by implication, 2.4% of men undergoing vasectomy would show persistent sperms in these small quantities for many months after the semen analyses taken at 3 and 4 months.

**Table 1** Indications for a repeat vasectomy

<i>Indication</i>	<i>Number</i>	<i>Percentage</i>
Persistent sperm after vasectomy	27	87.1
Late recanalization	1	3.2
Fistula of vas to skin	1	3.2
Stitch sinus	1	3.2
Vas histology negative	1	3.2
All indications	31	99.9

**Table 2** The proportions of those men with persistent sperm grouped by the numbers of sperm seen

<i>Group</i>	<i>Sperm concentration (number in n high-power fields)</i>	<i>Number</i>	<i>Percentage</i>
A	> 1 in 5	5	18.5
B	1 in 5-20	7	26.0
C	1 in 50-100	15	55.5
Total		27	100

*The questionnaire*

Of the 294 questionnaires distributed 165 (56%) were returned. Four were returned by urologists who did not perform vasectomies and were therefore not completed; thus 161 completed or partially completed questionnaires (55%) were analysed. Respondents were evenly distributed amongst all geographical regions and no significant regional variations in practice were discernible.

The responses of urologists regarding the need for repeat vasectomy where there were persistent non-motile spermatozoa or differing concentrations of motile spermatozoa are summarized in Table 3. The median time interval to a repeat vasectomy when there were motile sperm was 6 months (mean 6.8 months, range 2–24) and for non-motile sperm this increased to 12 months (mean 10.6 months, range 3–24).

A further question asked whether the urologist was aware of any case where pregnancy had occurred in the presence of non-motile sperm or with less than one motile sperm in 50 high-power fields. Of those responding, 115 (71%) answered and, for non-motile sperm, there were 17 affirmative replies. However, eight of these referred to published reports, while six provide no additional information, making further analysis

impossible. Of the three remaining instances two could be seen as 'genuine' cases, and were reported as currently undergoing legal consideration. The final affirmative was a reminder that non-motile sperm are capable of producing pregnancy in the context of 'sperm harvesting' and *in vitro* fertilization. Interestingly, none of the 37 urologists who do not repeat vasectomy for non-motile sperm were aware of any pregnancy occurring, except for one instance already reported in the literature [4].

There were three affirmative answers regarding pregnancies resulting from men with few motile sperm. Of these, one was already published, one was undergoing legal consideration and the last was described as a 'late recanalization'.

The section of the questionnaire inviting comments from the respondent is not open to statistical analysis, but three major themes predominated: (i) that the time interval and number of ejaculations between vasectomy and semen analysis, and the age of the man in question, were important. These topics have been considered at length elsewhere [6,7]; (ii) that medico-legal concerns were a highly influential factor in policy-making decisions, particularly regarding non-motile sperm; (iii) that there is a wide variation in experience, and in methods of semen analysis, throughout the country.

**Discussion**

In 1984 Philp *et al.* [2] suggested, in a review of 16 000 patients, that men with persistent spermatozoa after vasectomy could be offered a 'special clearance' if, after at least 7 months, two consecutive counts showed non-motile sperm in concentrations of <10 000/mL. They found no pregnancies resulting from this group. Six years later Davies *et al.* [3] reported on the follow-up of 151 men who fell into a similar special-clearance group, with the exception that no distinction between motile and non-motile sperm was made. Of their vasectomized men, 2.5% fell into this group, which is almost identical to the experience of the present study (2.4%), and again, no pregnancies attributable to the failure of the vasectomy were identified. Despite this, and a firm recommendation that vasectomy need not be repeated in this group, the majority of urologists would still perform a repeat operation. Furthermore, although 2.5% may be regarded as small, as a fraction of the total number of vasectomies carried out in Britain each year, it represents a significant number of men who may be exposed to a repeat operation, usually under a general anaesthetic, with no clear necessity.

From the results of the questionnaire, the two main bars to the universal adoption of the 'special clearance' group are the possibility of pregnancy and the medico-legal implications of such an occurrence. That this group

**Table 3** National practice regarding non-motile and motile sperm seen after vasectomy

	Number	Percentage
Urologists who would:		
Repeat vasectomy if non-motile sperm are still present 3–6 months after surgery	35	21.7
Repeat vasectomy if non-motile sperm are still present 7–12 months after surgery	75	46.6
Repeat vasectomy if non-motile sperm are still present 13–24 months after surgery	11	6.8
Never repeat vasectomy where non-motile sperm only persist	37	23.0
No reply given	3	1.9
Urologists who feel that:		
> 1 motile sperm per high-power field warrants a repeat vasectomy	9	5.6
> 1 motile sperm in 20 high-power fields warrants a repeat vasectomy	1	0.6
> 1 motile sperm in 50 high-power fields warrants a repeat vasectomy	8	5.0
Any motile sperm at all warrant a repeat vasectomy	128	79.5
No reply given	15	9.3
Totals	161	100



is capable of producing a pregnancy has recently been shown [5], but it does not necessarily mean that the special clearance group should be immediately abandoned, particularly when the risk of failure is considered in relation to other risks, i.e. those of a repeat operation and of late recanalization. The latter is now well accepted as an established risk of vasectomy, and has been estimated to occur in 0.04–0.1% of men undergoing the procedure [8,9].

Where medico-legal difficulties have arisen from late recanalization it would appear that they are more often due to a failure to forewarn the patient and their partner, rather than as a result of the phenomenon itself, and it is therefore essential that this risk is fully discussed and documented [10]. Although the chance of pregnancy arising from men in the special clearance group is impossible to determine at present, the results of this questionnaire and the few reports in the literature would suggest that the risk is less than that of late recanalization and therefore, where adequate discussion and warning is undertaken and recorded, it remains sensible to use the special clearance group, particularly as the long-term follow-up of these patients suggests that they will eventually become azoospermic [3]. Ultimately, the onus of abandoning contraception will lie with the patient and their partner, once the available facts have been clearly explained, but because in our experience very few, if any, men are worried about the risk of late recanalization, it seems unlikely that being in a special clearance group, where the risks are similar or perhaps less, will be of any significant concern to the vast majority of patients.

For those with motile sperm, the weight of opinion would seem to be more in favour of a repeat vasectomy, though the number of motile sperm that constitute a significant risk remains unclear.

The other major question raised by the present study concerns the laboratory method used in post-vasectomy semen analysis. Clearly, methods vary among localities and this affects both the results obtained and the clinical decisions that are subsequently made. Furthermore, the time that elapses between taking and analysing the sample is indisputably important. It has already been observed that centrifuging semen samples will detect sperm that are otherwise undetected [11] and whereas a wet preparation allows the identification of motile

sperm, it is not as sensitive as the slide-based preparation, which cannot distinguish motile from non-motile sperm. Add to this a variety of methods for describing the quantity of sperm seen, and it becomes easy to account for the wide variation in experience between British urologists, some of whom reported that they very rarely, if ever, encounter the problem of persistent sperm after vasectomy. Thus, before any policy is decided upon, it would be prudent to consider the local laboratory methods that are in current use.

## References

- 1 Edwards IS, Farlow JL. Non-motile sperms persisting after vasectomy: do they matter? *Br Med J* 1979; 1: 87–8
- 2 Philp T, Guillebaud J, Budd D. Complications of vasectomy: review of 16 000 patients. *Br J Urol* 1984; 56: 745–8
- 3 Davies AH, Sharp RJ, Cranston D, Mitchell RG. The long-term outcome following 'special clearance' after vasectomy. *Br J Urol* 1990; 66: 211–2
- 4 Thompson JA, Lincoln PJ, Mortimer P. Paternity by a seemingly infertile vasectomised man. *Br Med J* 1993; 307: 299–300
- 5 Smith JC, Cranston D, O'Brien T, Guillebaud J, Hindmarsh J, Turner AG. Fatherhood without apparent spermatozoa after vasectomy. *Lancet* 1994; 344: 30
- 6 Marshall S, Lyon RP. Variability of sperm disappearance from the ejaculate after vasectomy. *J Urol* 1972; 107: 815–7
- 7 Marwood RP, Beral V. Disappearance of spermatozoa from ejaculate after vasectomy. *Br Med J* 1979; 1: 87
- 8 Barnes MN, Bland JP, England HR *et al.* One thousand vasectomies. *Br Med J* 1973; 4: 216–21
- 9 Philp T, Guillebaud J, Budd D. Late failure of vasectomy after two documented analyses showing azoospermic semen. *Br Med J* 1984; 289: 77–9
- 10 Editorial. Late failure of vasectomy. *Lancet* 1985; 1: 794–5
- 11 Jackson LN. Sperm-counts after vasectomy. *Lancet* 1973; 1: 770

## Authors

J.R. Bengler, MB, ChB, Senior House Officer.

S.K. Swami, FRCS (Urol.), Senior Registrar.

J.C. Gingell, FRCS, Consultant.

Correspondence: Dr J.R. Bengler, The Bristol Urological Institute, Southmead Hospital, Westbury-on-Trym, Bristol BS10 5NB, UK.