

major cause for dropping out from the programme. As with extrasystoles it seems likely that the true incidence of angina was higher than that reported or diagnosed by direct questioning. Analysis of the questionnaire results suggests that a large number of the men had various types of chest pain, some of which may well have been angina.

If exercise is proved to be good for patients with coronary disease, and there is mounting evidence that this is so,<sup>7</sup> many questions arise. After recent acute myocardial infarction, what are the benefits? Questions about improvement in subsequent mortality and morbidity, attitudes and confidence, and incidence of return to work can only be answered by larger, longer, and controlled future trials. This study does not contribute any answers to these questions except that it strongly suggests that such exercises do lead to improvement in morale and probably encourage return to work.

Another question which will have to be answered is the correct time for starting such physical training after myocardial infarction. In this study patients have been selected for the programme six weeks after discharge from hospital, which is usually about two months after acute myocardial infarction.<sup>5</sup> This decision was arbitrary and was made because this time coincides with our first follow-up clinic visit. Royston,<sup>8</sup> however, starts his patients on light exercises while still in hospital and this may prove to be correct.

If there is any therapeutic value to exercise, what is the mechanism? Some types of exercise may confer benefit and others be useless or even harmful. It is fashionable and tempting to believe that the type of exercise which leads to most improvement in cardiac haemodynamic performance will prove to have the greatest therapeutic value but, as yet, we know of no evidence to confirm this. It could well be that prognosis after myo-

cardial infarction is more closely related to other unknown factors than to changes in the better understood physiological ones which can be routinely measured in cardiac catheterization laboratories. Sustained exercise over long periods may be of greater benefit than more strenuous short-term bouts which increase cardiac output and work.<sup>9</sup> Future controlled trials will have to keep these possibilities in mind.

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# One Thousand Vasectomies

STAFF OF THE MARGARET PYKE CENTRE

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## Summary

**In a prospective study of 1,000 people treated by vasectomy at the Margaret Pyke Centre under local anaesthesia as outpatients minor sepsis occurred in 12 cases, an abscess in one, and haematoma needing drainage in seven. Spontaneous recanalization of the vasa occurred in six patients and an unsuspected third vas was found in one.**

**Except in patients with recanalization or a third vas the semen was always free from motile spermatozoa within three months, but non-motile spermatozoa have so far persisted for up to 17 months in a few cases.**

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## Introduction

Vasectomy has become an increasingly acceptable form of birth control, thanks largely to the advocacy of the Simon Population Trust.<sup>1</sup> Since 1972 Parliament has added vasectomy to the methods of contraception which may be provided by local authorities. Nevertheless, several questions remain unanswered, the first of which concerns the operation itself.

## OPERATIVE TECHNIQUE

Numerous surgical techniques have been described. All have been designed to interrupt the passage of spermatozoa, prevent spontaneous recanalization of the vas, permit reanastomosis if the patient later changes his mind, and minimize the risks of sepsis and haematoma. Details of technique vary considerably. Many surgeons insist on a general anaesthetic, others prefer a local; some only cut the vasa, others remove a section; some seal the cut ends with diathermy, others tie them with silk, thread, or catgut, and others still prefer single or double tantalum clips. Some surgeons advise that the cut ends should be doubled back or crossed over or that the two distal and the two proximal ends should be tied together.<sup>2-13</sup> Satisfactory evidence that any one of these methods is preferable is wanting. The reported incidence of surgical complications differs widely between series and has generally been attributed to incompetence or inexperience—

that of sepsis, for example, has varied from 3.9%<sup>2</sup> to 6%<sup>8</sup>, and that of haematoma has been similarly inconsistent. Occasional cases are reported of Fournier's gangrene<sup>14</sup> and even of tetanus.<sup>15</sup>

#### PSYCHOLOGICAL SEQUELAE

In the past much has been made of the undesirable psychological effects of vasectomy. Very high incidences of regret have been reported, especially when postoperative complications were common<sup>16</sup> or after inadequate preoperative counselling of husband and wife.<sup>17</sup>

#### CRITERIA FOR STERILITY

It is generally agreed that it takes a little while for the storage system to become clear of spermatozoa after vasectomy, but it is not known whether a few persistent non-motile spermatozoa are evidence of continuing fertility or may be disregarded. It is at present considered advisable to show that every single spermatozoon, motile or non-motile, has been cleared from the semen, yet some very experienced authorities are content if no motile spermatozoa can be found in two successive specimens of uncentrifuged post operative semen.<sup>12 18</sup>

#### RECANALIZATION

Spontaneous recanalization of the divided vasa has been known since it was first reported by Rolnick,<sup>19</sup> and its aetiology and pathology have been studied.<sup>13-20</sup> The advocates of each method of dealing with the cut ends of the vasa claim that it prevents recanalization, but Livingstone<sup>8</sup> believes that at least 1,000 carefully followed up cases are needed in order to assess the recanalization rate.

#### Object of Study

The decision to set up a vasectomy service at the Margaret Pyke Centre in July 1971 offered an opportunity to answer some of these questions. In order to evaluate all the sequelae of the operation, including recanalization, a standard surgical technique was used in 1,000 cases completed in October 1972. To show that the operation could be properly done in an outpatient clinic under local anaesthesia the vasectomies were undertaken by experienced surgeons using scrupulous asepsis. The risk of psychological harm was minimized by detailed preoperative counselling, and all data and details of the follow-up were recorded on a fast-access retrieval system. All figures quoted are as they stood on 9 April 1973, six months after the last operation in this series.

#### Methods

##### SELECTION OF PATIENTS AND PREOPERATIVE COUNSELLING

The surgical members of the centre deliberately decided to entrust preliminary discussion of the operation to the counselling doctors, who had long experience of birth control methods. These doctors discussed the nature, risks, and probable effects of the operation with every couple. Breakdown of the marriage, death of the children, death of the wife, and future remarriage were all considered in the context of the virtually irreversible operation. Before recommending vasectomy the concurrence of the patient's general practitioner was sought and the surgeon satisfied himself that the operation was both indicated and feasible. Counselling doctors did not find it possible to lay down rigid or minimal requirements of age, marital status, or family size. Certain guidelines were, however, agreed and each couple

was individually assessed. The team was reluctant to offer vasectomy to young men; only 34 in the series were 25 or under. Nevertheless, many responsible young couples felt that they had had enough children at a relatively early age and sought vasectomy in preference to other methods of contraception. If the couple was particularly young the advice was designed to give them a few months in which to reconsider their decision.

There was also reluctance to treat the childless husband. Sometimes vasectomy was sought because of excessive fears about childbirth or inherited disease, but some of the couples who asked for vasectomy were obviously fulfilled by their professions or their jobs and had taken a responsible and informed decision not to have children. Only 37 of the 1,000 couples had no children together, and of these 15 had one or more children living with them, either adopted or by a previous marriage. Of these 37 men four were under 31 years of age, and special efforts were made to give them time to reconsider (see table I).

Altogether 140 other couples counselled during the same period as the 1,000 did not proceed to vasectomy—30 because they changed their mind, 30 because the general practitioner's consent could not be obtained or was withheld, 33 because the operation was not recommended by the counselling doctor, and the rest for a variety of reasons including contraindications to the use of local anaesthesia.

TABLE I—Number of Children per Age Group

	0	1 or 2	More than 2	Total
Husband's age:				
20 or less	0	0	0	0
21-25	2	23	9	34
26-30	2	128	61	191
31-35	6	165	119	290
36-40	9	128	104	241
41-50	15	110	93	218
Over 50	3	12	10	25
Not recorded	0	1	0	1
Total	37	567	396	1,000
Wife's age:				
20 or less	0	2	0	2
21-27	3	128	59	190
28-35	17	275	195	487
36-40	9	107	103	219
41-45	5	51	35	91
Over 45	3	3	4	10
Not recorded	0	1	0	1
Totals	37	567	396	1,000

#### SURGICAL TECHNIQUE

All the operations were performed by experienced urological surgeons, familiar with the operation from experience with open prostatectomy and with anatomical variations and postoperative complications of scrotal operations. A full aseptic technique was used in a specially equipped operating theatre where apparatus for immediate resuscitation was at hand. A back-up service for any major resuscitation was available from the Middlesex Hospital, across the road. Diazepam 10 mg was given by mouth 30 minutes before the operation.

After cleansing the scrotum, previously shaved by the patient, local anaesthesia was induced with 3 to 5 ml of 1% lignocaine, usually containing 1/100,000 adrenaline. The well-tried technique described by Freund and Davis<sup>4</sup> and Blandy<sup>21</sup> was chosen for this series. Each vas was picked up in its connective-tissue sheath, which was opened longitudinally. The vas was lifted out and between 1 and 4 cm was resected. Both ends were crushed and ligated with 3-0 black silk in order to minimize granulations and permit subsequent identification. Small vessels which bled were ligated with 4-0 plain catgut, which was also used to close the skin incision with two or three sutures. The incisions were sprayed with Nobecutane. The patient then walked to the recovery room and was allowed to rest for 10 to 15 minutes (with a cup of tea or coffee). The scrotum was examined for

evidence of swelling or bleeding and an elastic support was supplied. Patients were advised not to undertake heavy work for 48 hours and were given three telephone numbers in case scrotal swelling or unusual pain developed. Details of post-operative care were given by the nurse and were repeated on printed directions taken home by the patient.

#### FOLLOW-UP

One week after vasectomy the patient was examined by the surgeon, who noted any complaint and any local or general complication. A semen specimen was examined at 12 weeks and then at monthly intervals until two consecutive negative specimens could be reported. Specimens transferred from sheaths were often unsatisfactory because of contamination by oil globules from the lubricant. Other factors affecting the semen adversely were delay in receipt at the laboratory and contamination by germs. Patients are now, therefore, requested to make sure that their hands are as clean as possible when handling the specimen jar, to remove the cap only when ready to collect the semen and replace it again immediately afterwards and to produce the specimen after withdrawal or by masturbation directly into the container. Within 48 hours of collection each specimen was centrifuged, diluted in Ringer's solution, and examined on a Neubauer plate for the presence of spermatozoa and approximate sperm density.

Patients who developed haematomata requiring surgical treatment or sepsis or suspected recanalization of their vasa were referred to one of two hospitals, where they were treated by members of the surgical team who had performed the vasectomy.

One year after vasectomy patients were sent a questionnaire (see Appendix) designed to evaluate their feelings about the operation and its effects and asked to return a further specimen of semen.

The decision to report our findings at this stage instead of waiting a further six months, during which period the remainder of the patients would have completed their first postoperative year, was taken because we believe that the results so far obtained in 1,000 cases, treated in the conditions described, offer useful information to others undertaking a vasectomy service.

## Results

### OPERATIVE AND POSTOPERATIVE COMPLICATIONS

The most common complication of vasectomy under local anaesthesia was a slight vasovagal reaction (24 cases). Twelve patients complained of excessive pain, usually when traction was made on the vas. Two collapsed—one with an unrecordable pulse and a suspicion of cardiac arrest; he was revived with a precordial blow and elevation of the feet. Another patient suffered an episode of petit mal. There were no allergic reactions and no severe haemorrhages. Minor problems included retraction of the proximal end of the vas, slipping of the ligature, bleeding from adhesions from previous operations for undescended testis or hernia, and inadvertent opening of the tunica vaginalis testis (table II).

Altogether 122 early postoperative complications were noted at the end of the first month (table III). Forty-two patients had a haematoma but in only seven was this large enough to warrant further treatment. Patients who developed large haematomata were admitted to hospital; if evacuation was necessary it was done under general anaesthesia. Twelve patients had a minor local infection, which was treated with Septrin (co-trimoxazole); in most cases the infection was limited to a little redness of the wound edges. Only one patient developed a serious staphylococcal abscess, which continued to discharge until the silk suture was extruded from the wound; this was the only abscess and the only sinus in the 1,000 cases. In three patients signs of epididymitis were noted. This may have been caused by some reaction

TABLE II—Operative Complications

	No. of Cases
Excess pain .. .. .	12
Bleeding .. .. .	3
Vasovagal attack .. .. .	26 (including 2 cases of collapse)
Other .. .. .	31
Total .. .. .	72

TABLE III—Postoperative Complications reported by Surgeons within One Month of Operation

	No. of Patients
Excess local pain .. .. .	5
Pain referred to abdomen .. .. .	1
Pain referred to legs .. .. .	2
Minor haematoma .. .. .	35
Major haematoma requiring treatment .. .. .	7
Sepsis epididymo-orchitis .. .. .	3
Other sepsis requiring treatment .. .. .	12
Sinus .. .. .	1
Other local effects .. .. .	56
Total .. .. .	122

to pent-up spermatozoa in the epididymis or may have been a true infection. There was no evidence of urinary infection in any patient.

Sperm granulomata have been found in six cases so far but the eventual incidence may prove higher, since the complication has been reported as late as eight years after vasectomy.<sup>2</sup> Altogether 56 patients complained of minor symptoms, usually bruising, discharge, tenderness, or a mild reaction around the catgut sutures in the skin.

### REPLIES TO QUESTIONNAIRE

Up to the time of writing questionnaires had been sent to 460 patients. Of these 271 had replied and 208 had sent in their one-year semen specimen. Overall 257 patients were glad vasectomy had been done, five were sorry, eight were uncertain, and one did not answer the question. Most of the latter patients had suffered postoperative complications. Minor local complications more than one month after the operation had been experienced by 59 patients. Altogether 217 patients would recommend the operation to friends, though a further five were doubtful on this point. Fifty-eight patients felt that more counselling was needed in one or more details. The effects on sexual life, general health, and family harmony are shown in table IV.

Of the 208 semen specimens received 202 were free of spermatozoa. The remaining six contained non-motile spermatozoa, and these patients are being followed up until their semen is again clear.

Possibly the patients who did not reply to the questionnaire were those who were not pleased with the result of the operation. It is equally possible that they were content but did not want to be troubled with correspondence or tests or any reminders of a closed chapter. Those who did not answer the questionnaire are being followed up again. Their replies, together with accumulated replies sent in after April 1973, will be reported in a paper on the second 1,000 vasectomies.

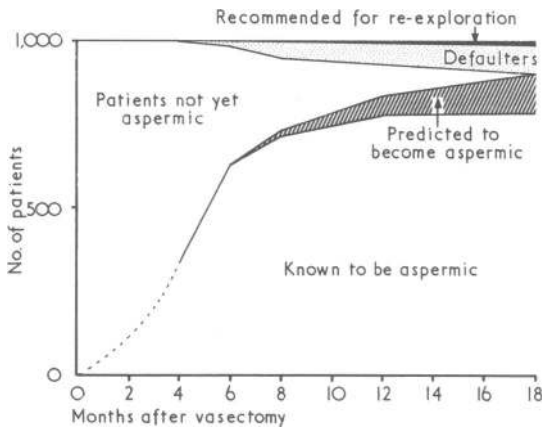
TABLE IV—Effects of Operation noted after One Year by 271 Patients

	Better	Same	Worse	Doubtful
Effect on sexual life .. .. .	167	92	12	
Effect on general health .. .. .	14	253	2	2
Effect on family harmony .. .. .	77	190	4	

### TIME TAKEN TO REACH STERILITY

In all but seven of the 1,000 patients no motile spermatozoa

were found in the centrifuged semen after operation. (Specimens were up to 48 hours old when examined.) Within six months 615 patients had achieved complete azoospermia (fig. 1), but 143 were still producing ejaculates containing non-motile spermatozoa 6-18 months after the operation. "Defaulters" were the 71 patients who had produced no specimens for examination for the last four months.

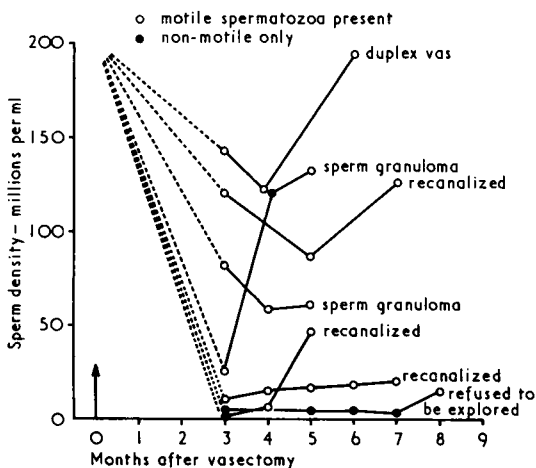


As might be expected patients with higher coital frequency tended to clear faster than others, though after eight months every coital frequency group included large numbers of patients who were still producing spermatozoa. Surprisingly, there was also a higher proportion of these men in the higher frequency groups. Men in the 31-40 age group seemed to clear slightly faster than those in other groups.

#### REOPERATION

It was decided that the seven men who were producing motile spermatozoa three months or more after vasectomy should be re-explored. Six agreed to operation and one refused any further investigation.

At re-exploration an unusual congenital anomaly was discovered in one patient in whom a third vas deferens had been missed at operation. In the other five the ends of the vasa were connected by a fusiform granuloma; in two cases injected radio-opaque contrast medium was seen to pass through it, and in one other histological examination showed epithelial-lined lacunae in the granulation tissue. Serial sections and wax model reconstructions would have been necessary to show for certain whether there was a patent canal through the granulation tissue



in the other two cases; these were not made but it seems probable that spermatozoa had found their way through it. The successive sperm counts of these seven patients are shown in fig. 2. After reoperation all six patients produced two consecutive aspermic specimens.

The operation to re-explore the divided vasa was always performed in hospital under general anaesthesia by one of the consultant surgical team. The granulomata and adjoining portions of vas were removed and the free ends retied. The operation is technically difficult and involves painstaking dissection of a scarred and distorted spermatic cord and a risk of injuring the testicular artery. It is certainly not a procedure suitable for an outpatient clinic.

#### Discussion

We believe that this study shows the value of scrupulous recording of the data pertaining to vasectomy, for we are now able to answer with some accuracy some of the questions posed at the outset of this inquiry. Others remain unanswered.

#### WHAT IS THE BEST SURGICAL TECHNIQUE ?

In this study a single surgical technique was used under local anaesthesia; there was a 0.7% incidence of haematoma requiring treatment, a sepsis rate of 1.2%, a foreign body sinus incidence of 0.1%, and a 5.6% incidence of other minor local symptoms. Recanalization occurred in 0.6% of the patients. Only a second similarly documented study can show whether any of the suggested modifications of the standard technique will improve on these figures. The next 1,000 cases should show if doubling the end of the vas back on itself reduces the incidence of recanalization without increasing the local morbidity. The present figures, however, refute the criticism that vasectomy under local anaesthesia is impracticable, painful, and followed by an unacceptable incidence of haematoma and sepsis. Indeed, these results compare favourably with any in the literature.<sup>22</sup>

#### GENERAL EFFECTS

Though the number of replies so far received to the questionnaire represents only just over a quarter of the total series they indicate an overall approval of the operation and its effects.

#### WHAT IS THE CORRECT CRITERION FOR STERILITY ?

It is still not known if a man who has only a few non-motile spermatozoa in his semen is fertile or not; neither our own experience nor any in the literature provides an answer. Anecdotes exist, such as the cases reported by Livingstone<sup>8</sup> and Cornes,<sup>23</sup> in which men with only non-motile spermatozoa are said to have fathered children, but in none of these cases has paternity been proved by blood group or HL-A studies. Equally anecdotal is the evidence of those surgeons with a vast experience of vasectomy who have never heard of a patient with non-motile spermatozoa fathering children. We can only add to these anecdotes—the wife of one patient in this series conceived during the period when her husband's semen showed only scanty non-motile spermatozoa. Paternity studies were not carried out.

Some authorities, whose experience commands respect,<sup>24</sup> insist that every last non-motile spermatozoon should be banished from the semen before the patient is given the all clear. This practice means that some men have to produce a specimen every month for many months after operation and must also continue with contraceptive precautions. This is undesirable for the patient and expensive of both time and money for the laboratory. One patient in this study was still producing non-motile sperma-

tozoa in the 14th specimen, 17 months after operation. Dodds<sup>12</sup> quoted a similar case. Our data suggest that this insistence is unreasonable. Of the 208 men who sent in a semen specimen a year after the operation and who had already been pronounced sperm-free 6 (3%) showed a reappearance of non-motile spermatozoa. Are these men now to be told they are fertile again? If not, where is the logic of telling them they were fertile when three months after vasectomy their semen still showed a few non-motile spermatozoa? The real question is, what are the chances that a pregnancy may be produced by non-motile spermatozoa? There are still no records of any long-term follow-up of men whose semen contains any non-motile spermatozoa.

There is a most important corollary to this problem. If non-motile spermatozoa can safely be regarded as dead, incapable of fertilizing ova, then should not washing out the vasa with distilled water or proflavine or any other spermicidal solution confer immediate sterility after vasectomy? This technique is claimed to cause the immediate disappearance of all motile spermatozoa from the semen.

To answer these questions a large sample of patients whose semen contains only non-motile spermatozoa and who have given up any form of contraception would have to be followed up. Any pregnancy that occurs during this time should be checked (by HL-A and red cell grouping studies) for paternity, but this would probably be unacceptable to most patients and might have medicolegal consequences. In the view of this team it is reasonable to tell such patients that the risk of pregnancy is believed to be minimal once only non-motile spermatozoa have appeared in the semen. At the same time permission should be asked to examine semen specimens yearly. The alternatives are to explore all those (about 40%) who still show non-motile spermatozoa in the ejaculate after six months or to try to kill all spermatozoa remaining in the vasa and seminal vesicles by an appropriate method of irrigation.

In the meantime a study has been undertaken on the viability of non-motile spermatozoa. This will form part of a future report.<sup>25</sup>

#### HOW MANY VASA RECANALIZE?

Only patients in whom motile spermatozoa were found at any time after operation were re-explored. In five of them there was evidence of recanalization but in the sixth a third vas was found—an extremely rare anomaly. There may be other cases still undetected in which recanalization has occurred since the last test or is in progress.

There are cases on record<sup>8,9</sup> where spermatozoa have reappeared in semen though two consecutive earlier specimens had been sperm-free, and in our own series there were many cases where a single aspermic specimen was succeeded by specimens showing non-motile spermatozoa, and one case by a specimen containing motile spermatozoa.

In these 1,000 cases the chances of spontaneous recanalization were less than 1%. In one patient (fig. 2) motile spermatozoa did not reappear until eight months after operation; so unless the semen of all patients is examined at intervals for the next few years the long-term risk of reunion cannot be assessed. Study of the literature does not produce any data on which to base an opinion.

#### Recommendations

In publicizing vasectomy it should be made clear that the operation is not absolutely guaranteed to make men sterile. Patients should be told that there is about a 99% certainty that they have been made permanently sterile—a figure which no other known method of contraception can match. There would then be no confusion, no suggestion of a false contract, and no grounds for an action for negligence against the surgeon, who had done his best to put the vasa apart even if nature subsequently reunited them.

There remains the possibility that improved surgical technique could lessen the chance of spontaneous reunion of the vasa. Until strict evidence rather than mere opinion exists to support any major modification of the standard operation of vasectomy no grounds for negligence should lie against a surgeon who does not treat the ends of the vas with diathermy or double them back. Marshall and Lyon<sup>9</sup> reported a case in which recanalization took place even though a section of vas had been removed, the lumina had been diathermized, and the ends doubled back and ligated with non-absorbable sutures. The present studies on vasectomy are being continued to examine the possibility of killing the stored spermatozoa by a suitable spermicidal solution injected at the time of vasectomy and to study variations of surgical technique and ways of minimizing the present small incidence of surgical morbidity. At present, however, we advocate careful record-keeping and mention of the slight chance of recanalization in the prevasectomy counselling. There are very few operations in surgery which offer more relief from anxiety to a married couple and their family and hardly any for which the surgeon can give as high a chance of success.

#### Appendix

##### QUESTIONS ASKED IN VASECTOMY QUESTIONNAIRE

(1) Since your operation has your health been better than/worse than/the same as before it?

(2) Since your operation has your sexual life been better than/worse than/the same as before it?

If worse is this due to lessening or loss of sexual desire or performance/impotence/painful ejaculation/other reasons (please specify)?

(3) Since your operation has the harmony of your family life been better than/worse than/the same as before it?

Please give brief details of any changes.

(4) Have you noticed any changes at or near the site of operation? Yes/No.

If so is the change swelling/discomfort/infection at the operation site or swelling/discomfort of the testicle or other changes (please specify)?

(5) How often do you have sexual intercourse now: less than once/1-3 times/more than 3 times a week?

(6) Before the operation did you feel that you had discussed adequately with the counselling doctor: the details/the immediate after effects of the operation and the effect on your general health/sexual life?

Please specify any other aspects of the operation which you feel had not been adequately discussed with the counselling doctor.

(7) Having had the operation do you feel that you could recommend such an operation to friends in a similar situation to your own? Yes/No/Uncertain.

(8) Do you think that you obtained the results you hoped for from the operation? Yes/No/Uncertain.

Please give brief details.

If there is anything you would like to add please do so.

#### Addendum

Since early April 1973 motile spermatozoa have reappeared in the semen of two further patients, one operated on a year previously and the other 17 months previously. They have been recommended for re-exploration.

Requests for reprints should be addressed to: Sir George Gunn, The Margaret Pyke Centre, London W1A 4QW.

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## Contemporary Themes

# Thoughts in Mind of a Person with Cancer

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### Summary

**The paper is based on the personal experience of many patients suffering from cancer. It analyses in a discursive way thoughts which may be present in the minds of cancer patients. The paper also briefly discusses the techniques used to minimize the common fears of the cancer patient.**

### Introduction

Of all the words in the English language probably none causes such personal dread as the word cancer, a word often believed synonymous with a death sentence.

This paper is based on a personal experience of more than 1,000 patients with malignant melanoma, and much experience with other malignant diseases. It is an attempt to condense my understanding of their thoughts at different stages of the disease.

### Stages of Thought

The thoughts of a patient with malignancy pass through several stages, the first being when he realizes that he has a disease which could possibly be malignant; the second when the malignancy is established but the condition is thought to be curable by the patient, his relatives, and the doctors; the third is when the disease is obviously no longer curable—recognized first by the doctor and before very long by the patient and his relatives; and the fourth and last stage is that of the dying patient.<sup>1</sup> Though the thoughts of the cancer patient generally fall into these stages there are, of course, exceptions because there are many different ways of coping with bad news. The stages may also overlap or be arrested by the patient who is unwilling to adjust to the realization of the progress of his disease.

Presentation of cancer may occur in one of two ways, and the mode of presentation will influence to some extent the patient's initial reaction to his knowledge of his disease. In one type the patient has what appears to him to be a minor complaint; one which has caused him no pain, no loss of strength or vitality and he presents to his doctor confident that with some trivial treatment he will be permanently cured. In the second method the patient has suffered from a variety of symptoms for weeks or months which have aroused his suspicions that all is not well—for example, steady loss of weight and appetite or chronic gnawing pain which causes him gradually to suspect that he may have a malignant disease.

All of us in times of great distress need some minimal time to become mentally adjusted to misfortune; a sort of acclimatization period. With a malignant disease which develops gradually this acclimatization is part of the developing process. If the patient has no idea that he has a malignant disease then the sudden "death sentence" (as he believes) can quite distort his judgment until he has had time to adjust. The transition of a healthy person into stage one of the mental adjustment to cancer may therefore be either gradual or sudden.

### Stage One

The first reaction of the patient in this stage begins when the "icy fingers" of contemplated death touch him. His initial reaction is therefore one of fear. He is frightened of several things—for instance, of dying and the unknown, of being dead, of leaving loved ones and happy associations. Another fear is that of the effects of treatment, even if successful. Few surgeons seem to fully appreciate the dread that many patients feel at the thought of a mastectomy, colostomy, or radical lymph node dissection. The patient's mind is therefore torn by conflicting fears, of the disease and death on the one hand, and mutilation from treatment on the other. Additionally, the patient may also be most apprehensive least he should reveal himself to be a coward and may try by various deceptions to conceal his terror.

While these dreads are developing in his mind another feeling may arise; a suspicion relating to his next of kin and his doctors. "Are they telling me the truth?" The wonderful account in *Othello* shows how the most trivial evidence can be accepted as concrete proof of bad news to the suspicious mind. The patient, once his suspicions have been fully aroused, will analyse every word said by the surgeon, intern, ward sister, and even hospital

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