11. Fosså SD, Åbyholm T, Normann N, Jetne V. Post-treatment fertility in patients with testicular cancer. III. Influence of radiotherapy in seminoma patients. *Br J Urol* 1986, **58**, 315–319.
12. Kreuser ED, Kurrle E, Hetzel WD, *et al.* Chronic gonadal toxicity in patients with testicular cancer after chemotherapy. *Eur J Cancer Clin Oncol* 1986, **22**, 289–294.
13. Hartlapp JH, Brensing KA, Voss KH, Deitenbeck R, Mumperow E. Longterm impairments of the gonadal function after cisplatin-based chemotherapy in 140 patients with testicular cancer. *Proc Am Soc Clin Oncol* 1990, **9**, 133.
14. Vejby Hansen P, Trykker H, Svennekjaer IL, Hvolby J. Long-term recovery of spermatogenesis after radiotherapy in patients with testicular cancer. *Radiother Oncol* 1990, **18**, 117–125.
15. Hansen SW, Berthelsen JG, von der Maase H. Long-term fertility and Leydig cell function in patients treated for germ cell cancer with cisplatin, vinblastine and bleomycin versus surveillance. *J Clin Oncol* 1990, **8**, 1695–1698.
16. Fosså SD, Aass N, Kaalhus O. Radiotherapy for testicular seminoma stage I: treatment results and long-term post-irradiation morbidity in 365 patients. *Int J Radiat Oncol Biol Phys* 1989, **16**, 383–388.
17. Fosså SD, Borge L, Aass N, Johannessen NB, Stenwig AE, Kaaalhus O. The treatment of advanced metastatic seminoma: Experience in 55 cases. *J Clin Oncol* 1987, **5**, 1071–1077.
18. Klepp O, Olsson AM, Henriksen H, *et al.* Prognostic factors in clinical stage I nonseminomatous germ cell tumors of the testis: multivariate analysis of a prospective multicenter study. *J Clin Oncol* 1990, **8**, 509–518.
19. Aass N, Klepp O, Cavallin-Ståhl E, *et al.* Prognostic factors in unselected patients with non-seminomatous metastatic testicular cancer: a multicenter experience. *J Clin Oncol* 1991, **9**, 818–826.
20. Freedman LS, Jones WG, Peckham MJ, *et al.* Histopathology in the prediction of relapse of patients with stage I testicular teratoma treated by orchidectomy alone. *Lancet* 1987, ii, 294–298.
21. Fosså SD, Klepp O, Aakvaag A. Serum hormone levels in patients with malignant testicular germ cell tumours without clinical and/or radiological signs of tumour. *Br J Urol* 1980, **52**, 151–157.
22. Zukerman Z, Rodriguez-Rigau LJ, Smith KD, Steinberger E. Frequency distribution of sperm counts in fertile and infertile males. *Fertil Steril* 1977, **28**, 1310–1313.
23. Setchell BP, Main SJ, Davies RV. Effect of ligation of the efferent ducts of the testis on serum gonadotrophins and testosterone in rats. *J Endocrinol* 1977, **72**, 13–14.
24. Fosså SD, Åbyholm T, Aakvaag A. Spermatogenesis and hormonal status after orchiectomy for cancer and before supplementary treatment. *Eur Urol* 1984, **10**, 173–177.
25. Fosså SD, Klepp O, Aakvaag A, Molne K. Testicular function after combined chemotherapy for metastatic testicular cancer. *Int J Androl* 1980, **3**, 59–65.
26. Fosså SD, Theodorsen L, Norman N, Aabyholm T. Recovery of impaired pretreatment spermatogenesis in testicular cancer. *Fertil Steril* 1990, **54**, 493–496.
27. Donohue JP, Foster RS, Rowland RG, Bihrle R, Jones J, Geier G. nerve-sparing retroperitoneal lymphadenectomy with preservation of ejaculation. *J Urol* 1990, **144**, 287–292.

**Acknowledgements**—The study was financially supported by the Norwegian Cancer Society.

The authors are grateful to Miss Gudrun Hosbach for her skilled technical assistance.

---

*Eur J Cancer, Vol. 27, No. 9, pp. 1091–1095, 1991.*
*Printed in Great Britain*

*0277-5379/91 $3.00 + 0.00*

# Psychosocial Well-being in Testicular Cancer Patients

**S. Kaasa, N. Aass, A. Mastekaasa, E. Lund and S.D. Fosså**

**149 testicular cancer patients with no evidence of disease for 3 or more years filled in a questionnaire which covered the following subjects: psychosocial well-being, working ability and use of analgesics/tranquilisers. The questions were chosen to compare cancer patients' morbidity with that of age-matched controls. The patients had been treated with surgery (32 patients), radiotherapy (39 patients), cisplatin-based chemotherapy plus surgery (46 patients) or chemotherapy plus radiotherapy with or without surgery (32 patients). Since no systematic differences between the treatment groups were found, the analyses were undertaken with all patients combined. The patients felt significantly less exhausted after a working day, were more satisfied with life and felt stronger and more fit than the controls. On the other hand, the patients reported a significantly higher incidence of anxiety and depression than the normal population. The results indicate that patients treated for a malignant disease may have greater fluctuations in mood and affect than the general population.**

*Eur J Cancer*, Vol. 27, No. 9, pp. 1091–1095, 1991.

## INTRODUCTION

TESTICULAR CANCER can be cured in about 90% of cases by the use of multimodal therapy, i.e. surgery, radiotherapy and chemotherapy [1, 2]. During the last years much attention has been paid to the possible long-term sequelae related to the different treatment modalities [3–9]. The most common side-effects are neuropathy, Raynaud-like phenomena, renal impairment, gastrointestinal symptoms and infertility.

Some reports considering long-term psychosocial morbidity in testicular cancer patients have been published [10–17]. The findings have not been consistent. Few investigators have evaluated the general impact of different treatment modalities. In many studies no control group has been used to compare the patients' morbidity with that of a normal population.

The present study was undertaken to investigate psychosocial morbidity in cured testicular cancer patients who had been in complete remission for more than 3 years.

## PATIENTS AND METHODS

In 1985 a questionnaire was sent to 160 testicular cancer patients who had shown no evidence of disease for at least 3 years. The subjects represented a consecutive series of patients referred to the Norwegian Radium Hospital (NRH) for primary treatment from 1978 to 1981. Patients with both seminoma and non-seminoma were included. Staging was done according to the Royal Marsden system [18]. Details of treatment after orchiectomy have been reported elsewhere [19–23]. All patients had undergone modern antineoplastic treatment, either single or multimodal, depending on the stage of the disease. The treatment consisted of infradiaphragmatic high voltage radiotherapy, cisplatin-based combination chemotherapy and/or surgery—mostly retroperitoneal lymph-node dissection (RLND).

The patients were divided into four subgroups according to treatment. Subgroup (1) had undergone unilateral RLND, $n = 32$; (2) infradiaphragmatic radiotherapy, $n = 39$; (3) cisplatin-based combination chemotherapy plus RLND (CT + RLND), $n = 46$; and (4) cisplatin-based combination chemotherapy plus infradiaphragmatic radiotherapy with or without surgery (mostly RLND) (CT + RT ± RLND), $n = 32$.

11 of the 160 patients did not answer the questionnaire, so 149 patients were included in the analysis (Table 1). The mean age at start of treatment for the non-responding patients was 32.5 (range 20–52) years compared to 34.0 (range 17–64) for the responders. In subgroup 1, 1 patient; subgroup 2, 4 patients; subgroup 3, 5 patients; and subgroup 4, 1 patient, respectively, did not answer the questionnaire. 1 of the non-responders was treated for relapse. 103 of the evaluable patients had non-seminoma and 46 had seminoma. Most of the patients were in stages I or II. 11 patients had been treated for relapse. The mean time for the entire group from start of treatment to answering the questionnaire was 5.1 (range 3–9) years.

The questionnaire covered the following subjects: demographic data, disease-related and treatment-related symptoms, psychosocial well-being, working ability and use of medication for pain and sleep problems. In the present paper only the findings related to the questions on psychosocial well-being, working ability and use of tranquilisers and analgesics will be presented.

The questions on the form had been used in different studies of normal populations in Norway. They were chosen so that cancer patients' morbidity could be compared with an age-matched Norwegian population. The following study populations were used as controls (frequency matching on age groups was done in all samples). Control group 1 consisted of 6277 age-matched men selected from a population study of 50 000 people carried out in the county of North-Tröndelag from 1984–1986 [24]. The respondents ranked their answers on a five or seven-point scale. The questions in this investigation were divided into four categories: subjective assessments of the working situation, the use of pain medication and tranquilisers, social interaction and general health/well-being (Table 2).

*Table 1. Patients' characteristics according to treatment modality*

| | Treatment groups | | | | |
|---|---|---|---|---|---|
| | 1 (RLND) | 2 (RT) | 3 (CT + RLND) | 4 (CT + RT ± RLND) | Total |
| No. of patients | 32 | 39 | 46 | 32 | 149 |
| Seminoma | 0 | 32 | 1 | 13 | 46 |
| Non-seminoma | 32 | 7 | 45 | 19 | 103 |
| Initial stage | | | | | |
| M | 0 | 0 | 1 | 2 | 3 |
| I | 32 | 38 | 0 | 6 | 76 |
| II | 0 | 1 | 29 | 18 | 48 |
| III | 0 | 0 | 2 | 2 | 4 |
| IV | 0 | 0 | 14 | 4 | 18 |
| Relapse | 0 | 0 | 1 | 10 | 11 |
| Age at start of treatment (years) | | | | | |
| Mean | 31.9 | 40.7 | 28.9 | 35.5 | 34.0 |
| Range | 18–58 | 17–64 | 17–57 | 20–64 | 17–64 |
| Time from start of treatment to answering questionnaire (years) | | | | | |
| Mean | 4.5 | 4.9 | 5.0 | 6.3 | 5.1 |
| Range | 3–6 | 3–7 | 4–9 | 4–9 | 3–9 |

RLND = retroperitoneal lymph node dissection, RT = radiotherapy, CT = cisplatin-based chemotherapy, M = elevated tumour markers without clinical metastases.

In control group 2 a sample of 5051 persons was drawn from the total Norwegian population [25]. A group of 1683 men were then used as controls in the present study. Anxiety and depression during the last 6 months were assessed. The patients were asked three questions (Table 3). The answers were ranked on a three-point scale with the possibilities "often", "sometimes" and "never".

Control group 3 consisted of a group of 520 men selected from a sample of 1606 persons [26]. The respondents were asked about their level of general well-being and anxiety/depression

*Table 2. Comparison between 149 cured patients and control group 1*

| Question | Best score* | Patients† | Controls† | *P* |
|---|---|---|---|---|
| Working ability | | | | |
| 1 Physical exhaustion | H | 2.87 | 2.24 | < 0.001 |
| 2 Concentration and attention | H | 2.55 | 2.12 | < 0.001 |
| 3 Comfortable with work | L | 1.77 | 1.83 | NS |
| Medication/sleeping problems | | | | |
| 4 Use of pain medication | H | 3.38 | 3.73 | NS |
| 5 Use of tranquilisers | H | 3.82 | 3.86 | NS |
| 6 Sleeping problems | H | 3.55 | 3.66 | NS |
| Social support | | | | |
| 7 Support | L | 1.21 | 1.48 | < 0.001 |
| 8 Loneliness | H | 4.12 | 4.11 | NS |
| Health and well-being | | | | |
| 9 Health | H | 3.18 | 3.03 | < 0.05 |
| 10 Satisfied/dissatisfied | L | 2.16 | 2.59 | < 0.001 |
| 11 Strong and fit/tired and worn out | L | 2.79 | 3.02 | < 0.05 |

*H = high, L = low.
† = Mean score.
NS = not significant.

---

Correspondence to S. Kaasa.
S. Kaasa, N. Aass and S.D. Fosså are at the Department of Medical Oncology and Radiotherapy, The Norwegian Radium Hospital, 0310 Oslo 3; A. Mastekaasa is at the Institute of Social Research, Oslo; and E. Lund is at the Institute of Community Medicine, University of Tromsø, Tromsø, Norway.
Revised 16 May 1991; accepted 6 June 1991.

*Table 3. Anxiety and depression in different treatment groups*

| Question | RLND | RT | CT + RLND | CT + RT ± RLND |
|---|---|---|---|---|
| 1 Bothered by heart palpitation | 16 | 11 | 31 | 26 |
| 2 Nervous, anxious, restless | 42 | 38 | 44 | 53 |
| 3 Depressed, dejected | 35 | 31 | 37 | 65 |

% score. Mean = percentage of patients who answered "often" or "sometimes" to the questions.
No differences were significant.

*Table 4. Comparison between 149 cured patients and control group 2*

| Question | Patients* | Control population* | P |
|---|---|---|---|
| 1 Bothered by palpitation | 17 | 8 | < 0.005 |
| 2 Nervous, anxious, restless | 40 | 16 | < 0.001 |
| 3 Depressed, dejected | 36 | 14 | < 0.001 |

*Mean = percentage of patients who answered "often" or "sometimes" to the questions.

during the previous 2 weeks. The questions were originally used by Bradburn to measure positive and negative affect [27].

The patients also filled in the Hopkin symptom checklist [28] which is a four-point graded scale from "not at all" to "very much".

Three questions were asked about sexuality: the first asked patients to assess their sexual lives in relation to others; the second asked about the number of times intercourse had taken place during the previous 30 days; and in the third the patients were asked to rank the last intercourse according to a four-point scale ranging from "very satisfactory" to "very unsatisfactory".

Answers to the North-Tröndelag questions (control group 1) were measured on a five or seven-point scale. The mean scores were calculated. The questions from the study "Survey of level of living" (control group 2) had three alternatives. The scale was dicotomised, and the percentages of patients answering "often" or "sometimes" were reported. The questions taken from the study "Values in Norway" (control group 3) had yes/no alternatives. The mean score difference within the cancer population and between the cancer population and the control populations were calculated. Differences between groups were tested with *t* tests.

## RESULTS

### *Comparisons between treatment groups*

For the questions assessing working ability, use of analgesics, and sleeping problems there were no differences between the treatment groups within the testicular cancer population. There was a tendency for the patients in subgroup 4 to use tranquilisers more frequently. Patients in subgroup 4 reported a tendency to worse health ($P = 0.09$), to be less satisfied with life in general ($P = 0.12$) and to feel less strong and fit ($P = 0.06$), than patients from the three other subgroups.

For the three questions dealing with anxiety and depression, patients who answered "often" or "sometimes" were compared with those answering "never". No group differences were found for items 1 and 2 dealing with anxiety (Table 3). There was a slightly higher incidence of depression in subgroup 4 (65%) compared with the others (35%, 31% and 37%, respectively) ($P = 0.08$).

The Hopkin symptom checklist findings showed no difference in anxiety, but a slightly higher level of depression in subgroup 4 compared to the other subgroups ($P = 0.15$). No group differences were found with regard to sexual problems.

### *Comparison between testicular cancer patients and samples from the Norwegian population*

Since there seemed to be no systematic differences between the treatment groups, the rest of the analyses was undertaken with all 149 testicular cancer patients combined in a single group and compared with the control groups. In response to the questions dealing with working ability, the cancer patients felt less physically exhausted after a working day than the control group ($P < 0.001$) (Table 2). Similar results were found for the question dealing with exhaustion in relation to the amount of concentration and tension at work ($P < 0.001$). There was no difference between the patients and the control population with respect to work satisfaction, use of pain medication or tranquilisers or sleeping problems.

For question 7 (Table 2), dealing with social support, the control group felt less confident of receiving the necessary support from family and friends if they felt ill than the cancer group ($P < 0.001$). The cancer patients had a higher opinion of their own health than the control population had of theirs ($P < 0.05$). The cancer patients were also more satisfied with life than the general population ($P < 0.001$) and felt stronger and more fit ($P < 0.05$).

40% of the cancer patients answered that they often or sometimes had been affected by nervousness, anxiety and restlessness compared with 16% of the control population ($P < 0.001$) (Table 4). The same pattern was seen when respondents were asked about depression and dejection (36% vs. 14%) ($P < 0.001$) and heart palpitation without physical effort (17% vs. 8%) ($P < 0.005$). The cancer patients felt more depressed and unhappy than the control population (question 8) (21% vs. 9%) ($P < 0.001$) (Table 5). For the three positively-worded

*Table 5. Comparison between 149 cured patients and control group 3*

| Question | Patients | Control population | P |
|---|---|---|---|
| 1 Particularly excited and interested in something | 78 | 63 | <0.001 |
| 2 So restless you could not sit long in a chair | 26 | 23 | NS |
| 3 Proud because someone complimented you on something you had done | 41 | 35 | NS |
| 4 Very lonely or remote from other people | 11 | 6 | NS |
| 5 Pleased about having accomplished something | 88 | 88 | NS |
| 6 Bored | 22 | 23 | NS |
| 7 On top of the world | 72 | 56 | <0.001 |
| 8 Depressed or very unhappy | 21 | 9 | <0.001 |
| 9 Things went your way | 84 | 76 | <0.005 |
| 10 Upset because someone criticised you | 16 | 14 | NS |

Percentage of patients who answered "yes" to the questions.

questions asking about excitement/interest (question 1), happiness (question 7) and whether things were going their way (question 9), the cancer patients gave significantly more positive answers than the control population. For the positive/negative affect questions the cancer patients had systematically higher scores than the control population except for the items "Pleased about having accomplished something" (question 5) and "bored" (question 6).

## DISCUSSION

The present population of 149 patients constitutes a majority of the testicular cancer patients in Norway treated during the period 1978–1981.

In this study the cancer patients reported a higher frequency of psychological distress (anxiety, depression, unhappiness) than the control populations. Similar results were reported by Tross *et al.* [10]. In one study 22% of the testicular cancer patients had a high level of psychological morbidity but no comparison with a control group was performed [13]. However, other studies have indicated less or the same amount of psychological distress in cancer survivors as in control persons [11, 12, 15]. Differences between study populations in regard to anxiety and depression may be due to methodological difficulties in measuring these variables. However, variations may also be explained by cultural and social differences between Europe and the USA. In the present study, questions which had been used in normal populations in Norway were chosen. None of the measures are used regularly in the diagnosis of anxiety and depression which may be regarded as a shortcoming.

In the present study the patients' self-reports on general satisfaction with life and health were more positive than those of the normal population, which is similar to findings in another study [15]. The differences between the patients "positive" self-ratings on health/general satisfaction with life on the one hand, and the high anxiety and depression on the other hand may seem self-contradictory, but can probably be explained as follows: measures of general satisfaction with life and health may be of a cognitive nature, while measures of anxiety and depression may be affective. In addition to the possible difference between affective and cognitive measures, the cancer patients seem to be more extreme in their answers to these questions.

It is also possible that the experience of having suffered from a life-threatening disease and having coped with it gives patients a positive view of life. At the same time, fear of relapse may lead to anxiety and depression, which was found in an earlier study [13]. Patients who had received the most extensive treatment (of these patients 10 out of 32 were treated for relapse) tended to have a higher level of anxiety and depression. The finding that the highest level of psychological morbidity was found in patients who had received the most toxic treatment (subgroup 4) is consistent with that of a previous investigation [13].

The incidence of sexual problems found in the present study is somewhat lower than in others. Only 14 out of 149 patients (10%) reported their sexual life to be inferior to that of others. In other studies [13–15, 29, 30] 20–50% of the testicular cancer patients reported sexual problems. The questions assessing sexual problems in the present study were considered retrospectively to be suboptimal, which may explain the low incidence of sexual problems reported. This emphasises the need for appropriate questions and scales when subjective variables are measured in clinical studies.

So far, few studies evaluating quality of life of testicular cancer patients have been published [10–17]. In particular, there is a lack of prospective investigations in this field. In the available reports crosscultural differences have been found, and some differences may be due to methodological problems. This calls for a broad crosscultural cooperation in quality of life measurement in cancer populations, and for contributions from both the medical and the psychosocial sciences.

---

1. Fosså SD, Aass N, Kaalhus O. Testicular cancer in young Norwegians. *J Surg Oncol* 1988, **39**, 43–63.
2. Peckham M. Testicular cancer. *Acta Oncol* 1988, **27**, 439–453.
3. Aass N, Kaasa S, Lund E, Kaalhus O, Heier MS, Fosså SD. Long-term somatic side-effects and morbidity in testicular cancer patients. *Br J Cancer* 1990, **61**, 151–155.
4. Fosså SD, Ous S, Åbyholm T, Loeb M. Post-treatment fertility in patients with testicular cancer. I. Influence of retroperitoneal lymph node dissection on ejaculatory potency. *Br J Urol* 1985, **57**, 204–209.
5. Fosså SD, Aass N, Kaalhus O. Long-term morbidity after infradiaphragmatic radiotherapy in young men with testicular cancer. *Cancer* 1989, **64**, 404–408.
6. Hamilton CR, Horwich A, Bliss JM, Peckham MJ. Gastrointestinal morbidity of adjuvant radiotherapy in stage I malignant teratoma of the testis. *Radiother Oncol* 1987, **10**, 85–90.
7. Roth BJ, Greist A, Kubilis PS, Williams SD, Einhorn LH. Cisplatin-based combination chemotherapy for disseminated germ cell tumors: long-term follow-up. *J Clin Oncol* 1988, **6**, 1239–1247.
8. Bissett D, Kunkeler L, Zwanenburg L, *et al.* Long-term sequelae of treatment for testicular germ cell tumours. *Br J Cancer* 1990, **62**, 655–659.
9. Boyer M, Raghavan D, Harris PJ, *et al.* Lack of late toxicity in patients treated with cisplatin-containing combination chemotherapy for metastatic testicular cancer. *J Clin Oncol* 1990, **8**, 21–26.
10. Tross S, Holland JC, Bosl G, Geller N. A controlled study of psychosocial sequelae in cured survivors of testicular neoplasms. *Proc Am Soc Clin Oncol* 1984, **3**, 74.
11. Trump DL, Romsaas EP, Cumings KC, Malec JF. Assessment of psychologic and sexual dysfunction in patients following treatment of testis cancer: a prospective study. *Proc Am Soc Clin Oncol* 1985, **4**, 250.
12. Cassileth BR, Steinfeld AD. Psychological preparation of the patient and family. *Cancer* 1987, **60**, 547–552.
13. Moynihan C. Testicular cancer: the psychosocial problems of patients and their relatives. *Cancer Surv* 1987, **6**, 477–510.
14. Gritz ER, Wellisch DK, Landsverk JA. Psychosocial sequelae in long-term survivors of testicular cancer. *J Psychosoc Oncol* 1988, **6**, 41–63.
15. Rieker PP, Fitzgerald EM, Kalish LA, *et al.* Psychosocial factors, curative therapies, and behavioral outcomes. A comparison of testis cancer survivors and a control group of healthy men. *Cancer* 1989, **64**, 2399–2407.
16. Tamburini M, Filiberti A, Barbieri A, *et al.* Psychological aspects of testis cancer therapy: a prospective study. *J Urol* 1989, **142**, 1487–1490.
17. Stuart NSA, Grundy R, Woodroffe CM, Cullen MH. Quality of life after treatment for testicular cancer—the patient's view. *Eur J Cancer* 1990, **26**, 291–294.
18. Horwich A, Brada M, Nicholls J, Jay G, Hendry WF, Dearnaley D, Peckham MJ. Intensive induction chemotherapy for poor risk non-seminomatous germ cell tumours. *Eur J Cancer Clin Oncol* 1989, **25**, 177–184.
19. Fosså SD, Aass N, Kaalhus O. Radiotherapy for testicular seminoma stage I: treatment results and long-term post-irradiation morbidity in 365 patients. *Int J Radiat Oncol Biol Phys* 1989, **16**, 383–388.
20. Fosså SD, Borge L, Aass N, Johannessen NB, Stenwig AE, Kaalhus O. The treatment of advanced metastatic seminoma: experience in 55 cases. *J Clin Oncol* 1987, **5**, 1071–1077.
21. Aass N, Fosså SD, Ous S, *et al.* Is routine primary retroperitoneal lymph node dissection still justified in patients with low stage non-seminomatous testicular cancer? *Br J Urol* 1990, **65**, 385–390.
22. Klepp O, Fosså SD, Ous S, *et al.* Multi-modality treatment of advanced malignant germ cell tumours in males. I. Experience with cis-platinum based combination chemotherapy. *Scand J Urol Nephrol* 1984, **18**, 13–19.
23. Aass N, Fosså SD, Ous S, *et al.* Prognosis in patients with metastatic

non-seminomatous testicular cancer. *Radiother Oncol* 1990, 17, 285–292.
24. Eriksen J, Naess S. *Functional Disability in North-Tröndelag*. Oslo, Institute of Applied Social Research, 1986.
25. Kiberg D. Survey of level of living 1987. Report no 77. Bergen, Norwegian Social Science Data Services, 1988.
26. Listhaug O, Jensen AT, Mysen T. Values in Norway: study description and codebook. Report no 11. Trondheim, Department of Sociology, The University of Trondheim, 1983.
27. Bradburn NM. *The Structure of Psychological Well-being*. Chicago, Aldine, 1969.
28. Derrogatis LR, Lipman RS, Covi L. Neurotic symptom dimensions. *Arch Gen Psychiatry* 1971, 24, 454–464.
29. Schover LR, von Eschenbach AC. Sexual and marital relationships after treatment for nonseminomatous testicular cancer. *Urology* 1985, 25, 251–255.
30. Schover LR, Gonzales M, von Eschenbach AC. Sexual and marital relationships after radiotherapy for seminoma. *Urology* 1986, 27, 117–123.

**Acknowledgement**—This work was supported by the Norwegian Cancer Society.

---

*Eur J Cancer, Vol. 27, No. 9, pp. 1095–1099, 1991.*
*Printed in Great Britain*

*0277-5379/91 $3.00 + 0.00*

# Retrospective Analysis of 318 Cases of Uterine Sarcoma

**K.S. Oláh, H. Gee, S. Blunt, J.A. Dunn, K. Kelly and K.K. Chan**

**A study of data from 318 cases of uterine sarcoma presenting during a 10-year period (1967–1976) is reported. All but 6 of the patients had at least a 5-year follow-up (98% 5-year follow-up). Overall 5-year survival was 31%, with the major prognostic indicator being tumour stage. Despite the tendency for mixed mesodermal tumours to present in older women with more advanced disease, survival was not statistically different to those patients with leiomyosarcomas. Thus, the propensity for tumour dissemination in leiomyosarcomas should not be underestimated. Leiomyosarcomas are less likely to present with abnormal symptoms than are other sarcomas, and their occurrence as an incidental finding on histological examination underlines the need for an adequate inspection of the intra-abdominal contents at hysterectomy. The tendency to treat all sarcomas as if they were endometrial tumours may be fallacious, and an alternative classification (such as the TNM system) may be required. Recurrence of tumour tended to be at distant sites (distant:pelvic recurrence rate 3:1). Adjuvant radiotherapy is unlikely to alter distant disease foci, and thus the development of combination chemotherapeutic regimens using agents which have shown to result in tumour response seem warranted. Such trials will need to be organised on a multicentre basis to attain statistically evaluable numbers of patients.**

*Eur J Cancer*, Vol. 27, No. 9, pp. 1095–1099, 1991.

## INTRODUCTION

UTERINE SARCOMA is a rare tumour, accounting for only 1–3% of all female genital tract malignancy [1, 2], and between 3 and 7.4% malignant tumours of the corpus uteri [1, 3]. In order to provide more information for the clinician, a retrospective study of uterine sarcoma was undertaken using cases reported to the Birmingham Regional Cancer Registry during the 10-year period 1967–1976. It was hoped that such information would yield survival data for the various tumour types, and determine the influence, if any, of radiotherapy and chemotherapy on survival.

## PATIENTS AND METHODS

The data were taken from the Birmingham Regional Cancer Registry, which serves a female catchment population of 2.582 million (1971 population census). It is considered that the West Midlands region contains proportions of industrial, commercial and agricultural subpopulations similar to those found nationally [4]. Efficiency of case registration exceeds 95% and less than 1% of registered cases are untraced [4].

Data were taken from the registry records of patients with uterine sarcoma registered in the 10-year period 1967–1976. In all but 6 of the 318 cases presented, a 5-year follow-up has been achieved (i.e. a 98% 5-year follow-up). Data were taken mainly from registry records, but where information was lacking, further details were sought from case notes. Written consent was obtained from the appropriate clinicians in the region.

Where survival data are presented graphically, actuarial survival curves are used. Logrank tests (Mantel–Cox) have been used for the statistical comparison of the curves.

## RESULTS

### *Incidence*

In the 10-year period 1967–1976, 318 cases of uterine sarcoma were registered. This gives an annual incidence of 1.23/100 000 female population. There was no evidence of a changing incidence during this 10-year interval. For comparison, during the

---

Correspondence to K.S. Oláh.
K.S. Oláh is at the Academic Department of Obstetrics and Gynecology, Birmingham Maternity Hospital, Edgbaston, Birmingham B15 2TG; H. Gee is at the Department of Obstetrics and Gynecology, University of Birmingham; S. Blunt and K.K. Chan are at the Department of Obstetrics and Gynecology, Birmingham and Midland Hospital for Women, Sparkhill; and J.A. Dunn and K. Kelly are at the CRC Trials Unit, Queen Elizabeth Hospital, Birmingham, U.K.

Revised 30 May 1991; accepted 19 June 1991.