

## Suicide, Cancer and Depression

By F. A. WHITLOCK

**SUMMARY** A comparison has been made between persons aged 50 and over dying from suicide and a matched control group of persons dying from other violent causes with respect to the incidence of malignant neoplasms and benign intracranial tumours found at autopsy. Significantly more of the suicide cases were found to have cancer, meningiomas and benign pituitary tumours. The implications of this finding and the relationship between depression and neoplasia are discussed.

Awareness of a possible relationship between melancholia and malignant disease is as old as Galen, who commented that melancholy women were more prone to cancer than those of sanguine temperament. In more recent times Sir James Paget (1863) declared, 'We can hardly doubt that depression is a weighty addition to the other influences that favour the development of the cancerous condition.' None the less, despite these clinical observations, the association between cancer and depression remains obscure, while suicide by a patient suffering from terminal malignant disease is generally regarded as an understandable response to pain and fear. In fact, relatively few cancer patients take their lives, but when this occurs the more obvious explanation may not be the correct one. Not only are some suicides unaware that they have cancer, but even when the knowledge was available it is by no means clear whether this was the decisive factor for the final act. An intervening variable of severe depression may be of greater importance in determining whether the patient will die by suicide or allow nature to take her course.

A number of studies have examined the association between cancer and melancholia. Fras *et al* (1967) found a high incidence of depression (76 per cent) in patients with carcinoma of the pancreas, in half of whom the psychiatric illness developed before the physical symptoms of malignancy. Benos (1974) also

regarded depression, insomnia, anorexia, weight loss, restlessness and abdominal pain as possible symptoms of carcinoma of the pancreas in older subjects. Rieke (1975) reported on 23 cases of cerebral tumour who developed depressive psychoses; eight of the patients had meningiomas, and depression was most often associated with temporal lobe and mid-line tumours. Three depressed patients described by Goldfarb *et al* (1967) had carcinoma of the breast. One, who made a suicidal attempt in the course of her depression, made a remarkable recovery with ECT and antidepressant medication, and there was an apparent regression of the tumour. Kerr *et al* (1969) found a higher than expected mortality from cancer during a four-year follow-up of patients who had been treated for depression, but Evans *et al* (1974), using the facilities of the Oxford Record Linkage Study, were not able to substantiate this finding.

Turning to suicide and cancer, Sainsbury (1955) found that physical illness was a factor in 29 per cent of his suicide cases. He estimated that the incidence of cancer was twenty times greater than in the general population, there being 14 among 390 suicides investigated. Dorpat *et al* (1968) found cancer in 8 per cent of 80 cases of suicide compared with 0.43 per cent in the general population. These authors noted that physical illness was a commoner precipitant of suicide in men than in women, and that surgery or the prospect of surgery for

cancer was an additional contribution. In this respect urological surgery in males may be particularly important (Fawcett, 1972). It is not clear from either of these two studies how many of the victims knew they had cancer or whether it was discovered in the course of autopsy. Barraclough (1971) found a high incidence of terminal malignancy and other conditions likely to be fatal within two years in a group of thirty suicides aged 65 and over when compared with a matched control group who had sustained accidental deaths. Not all the cancer cases had been diagnosed before their deaths.

### Methods

In a recent investigation of 135 suicides in Brisbane in 1973 (Chynoweth *et al.*, 1977) it was observed that three of the subjects had malignant tumours and a further two had benign intracranial neoplasms. All were more than 50 years of age. Taking this as the starting point of the present investigation the 1965–1967 post-mortem records, maintained by the Government Pathologist in Brisbane, were searched for all cases of suicide aged 50 and over. This number was added to the 50 suicides in the same age-range observed in the Brisbane Suicide Study. The exclusion of subjects aged less than 50 was determined largely by the relative infrequency of carcinoma deaths in younger persons.

As the prevalence of cancer in the general population is not known, a sample of persons dying violent deaths—mainly road traffic accidents—matched for age and sex, were drawn consecutively from the post-mortem records for the years 1965–1967 and 1973. Accident and other forms of violent deaths among women aged 50 and more are relatively uncommon events compared with their incidence in men, and consequently it was necessary to go to the years 1968 and 1974 to obtain a sufficient number of female controls, also taken consecutively to match the suicides according to age. It was not possible to match for social class and occupation; but, judging by the data available in post-mortem records, it seemed improbable that the cases and controls would differ to any significant extent with respect to these two variables.

### Results

Over the four years, 273 suicides aged 50 and over were recorded. Among these there were 17 cases of malignant neoplasm and 4 of benign intracranial neoplasm (2 meningiomas and 2 pituitary adenomas). The age and sex distribution of the suicide cases with neoplasms are shown in Table I.

Leaving aside the benign neoplasms there were no special organs affected, and in none of the 17 cases of malignancy were macroscopic intracranial metastases observed. The sites of the cancers are given in Table II.

Compared with the suicide cases there were two malignant tumours and one benign (acoustic neuroma) found in the control group. One man was under treatment for carcinoma of the prostate, and the other was found post-mortem to have a bronchial carcinoma which had not previously been diagnosed. Both were killed in motor vehicle accidents. The acoustic neuroma was also in a male subject.

Treating the numbers of tumours encountered as Poisson variables, the difference between 17 and 2 malignancies in the two samples is statistically highly significant ( $P < .001$ ; see Sichel, 1973). Adding in the benign tumours merely increases the statistical significance of this difference.

The finding of 17 cases of malignant growth in the suicide sample was next compared with the expected number of cancer deaths that would have occurred had the rates been the same in those recorded for the whole Queensland population for the four years of the survey. On an age and sex basis the expected number of cancer deaths to occur in 273 persons aged 50 and over was 1.25. Again, on the Poisson distribution the difference between the observed and expected numbers is highly significant ( $P < .001$ ).

Unfortunately, cancer prevalence rates in Queensland are not known and it might reasonably be objected that simply comparing observed and expected deaths of persons with malignant disease is not a satisfactory procedure. Furthermore, bearing in mind that in a percentage of the suicides and control cases their diseases had not been diagnosed before death, it would be impossible to obtain an exact prevalence rate

TABLE I  
*Suicides and neoplasms*

Age	..	..	50-	55-	60-	65-	70-	75+	Total
<i>Suicide cases</i>									
M	..	..	4 <sup>1</sup>	39	17	17	18	16	148
F	..	..	30	32	17	26	10	10	125
<i>Malignant tumours</i>									
M	..	..	1	2	2	3	2	—	10
F	..	..	1	—	1	—	2	3	7
<i>Benign tumours</i>									
M	..	..	—	1	—	—	—	—	1
F	..	..	—	—	2	—	1	—	3
<i>Accident cases</i>									
Malignant tumour:			Male aged 63						
			" " 74						
Benign tumour:			" " 57						

TABLE II  
*Sites of malignant growths*

<i>Suicide cases</i>									
Male				Female					
Stomach	..	..	..	2	Uterus	..	..	..	3
Lung	..	..	..	2	Liver	..	..	..	1
Skin melanoma	..	..	..	2	Colon	..	..	..	1
Pancreas	..	..	..	1	Mediastinum	..	..	..	1
Prostate	..	..	..	2	Breast	..	..	..	1
Kidney	..	..	..	1					
<i>Accident cases</i>									
Male				Female					
Prostate	..	..	..	1					
Lung	..	..	..	1					

of malignancy in the general population aged 50 and over. Hence one has to assume that the differences noted between suicide and other violent death subjects are representative of the differences that might be expected between the suicides and the general population.

### Discussion

The results of this investigation, in so far as they relate to a particular population aged 50 and more, are clear-cut; there was a far higher than expected incidence of neoplasms among

suicide victims compared with the matched control sample. Admittedly, only 6.2 per cent of the total suicide sample were found to have malignant disease, a figure which increases to 7.7 per cent when benign intracranial neoplasms are included. However, this is a sufficiently high figure to prompt one in some cases to consider the possibility of neoplastic disease as a factor related in some undetermined way to suicidal depression in older patients.

As already mentioned, in by no means all of these subjects had the disease been diagnosed

during life, and even when diagnosed and under treatment the patient was not always aware of the nature of his illness. In 7 of the malignant cases in the suicide group and 1 malignant case in the control group carcinoma had not been diagnosed before death. All the intracranial tumours were discovered at autopsy. Ten of the suicides had received treatment for their cancers, but it was not known in all these cases whether the patient was fully informed of the nature of his or her illness. Hence, one cannot conclude that suicide in all these subjects was due to their awareness of serious and possibly fatal illness, and some other explanation must be considered. It is noteworthy that in some patients described by other investigators depression anteceded the diagnosis of cancer—sometimes by years—and it is reasonable to conclude that most of the Brisbane suicides were profoundly depressed before they took their lives. The frequency of depression as a precursor to suicide is a well established fact in older patients, where depression may account for 70 to 80 per cent of diagnoses (Sainsbury, 1962; Barraclough, 1971). Although background information was not complete, there was evidence in some Brisbane cases of depression for which the patients were being treated shortly before their deaths or had been treated in the past.

A number of possible causal mechanisms have been postulated by Kerr *et al* (1969) linking depression and cancer. Carcinomatous neuropathy sometimes precedes the clinical manifestations of neoplasm by years. The mechanism whereby cryptic, small tumours, often of the lung or ovary, cause major CNS disease is not understood, but it would be reasonable to presume that psychological illness could be a response to a hidden carcinoma in a manner similar to the better known neurological disorders. As Kerr *et al* remark, 'Depressive illness development in men of late middle age without previous psychiatric illness . . . may be an early and direct manifestation of malignant disease.'

An alternative possibility is that previous depression or prolonged stress could temporarily impair a patient's immunological defences against circulating neoplastic cells. In normal circumstances these are adequately destroyed

by immune processes, and if these are inactivated neoplastic cells may be able to gain a lodgement and start to multiply. In this context it is interesting to note the patient described by Goldfarb *et al* (1967), whose carcinoma regressed when her depression was adequately treated. The evidence that brain mechanisms can influence immunological competence has recently been reviewed by Stein *et al* (1976), and there is enough clinical—sometimes anecdotal—evidence to indicate that a patient's mood can affect, for better or worse, the course of malignant disease (Le Shan, 1966; Solomon, 1969). That malignant disease can impair cell-mediated immunocompetence is well established (Bolton *et al*, 1975; Holmes and Golub, 1976), but whether severe depression has the same effect is not known. Undoubtedly tumours can regress spontaneously, and it is well known that more neoplasms are discovered at post-mortem examination than are diagnosed during life (Currie, 1974). To what extent a patient's experience of psychological stress affects these phenomena is an interesting question that clearly requires further investigation.

Sundby (1967) has reviewed the causes of death in alcoholics, who have a higher incidence of carcinoma of the larynx, lung and upper gastro-intestinal tract. The contribution of alcohol to depression and suicide is a well-established fact, and at least one of the three malignant tumour cases in Brisbane in 1973 was that of a known alcoholic. He had an unsuspected carcinoma of the kidney. It is impossible to say to what extent alcoholism or excessive drinking were contributory factors to the development of cancer and depression in other subjects in this series, but it is probably safe to conclude that, in male cases particularly, this could have been a major issue during life.

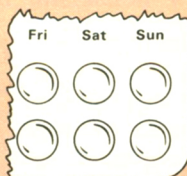
Some interesting points are raised by the four undiagnosed benign intracranial tumours in these cases. None of these was particularly large, except for one pituitary adenoma which had expanded the sella turcica considerably. Certainly the meningiomas were not sufficiently large to cause brain damage and raised intracranial pressure, consequences which appear more often to cause symptoms of dementia



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1. Symposium, "Research and Clinical Investigation in Depression" Stratford-upon-Avon, 1975, p.90.

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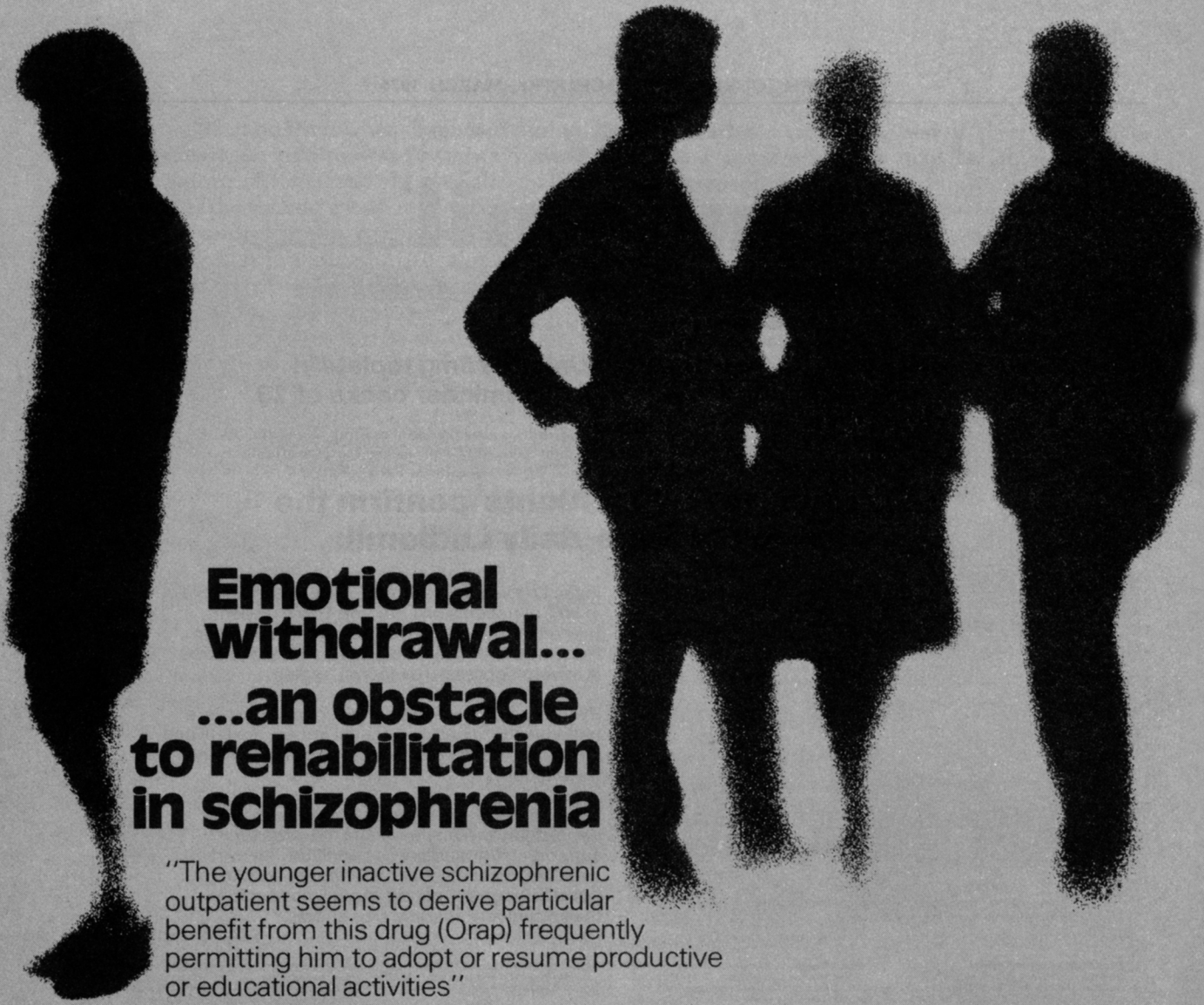
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(Sachs, 1950). However, depression as a major symptom of meningiomas is not uncommon. In 5 of the 7 cases described by Avery (1971) depression was a prominent feature, as it was in one of the 3 cases described by Hunter *et al* (1968). The meningioma case in Smith's series of organic syndromes (1954), a 62-year-old woman, was initially diagnosed and treated as a case of depression. In Rieke's (1975) 23 cases of cerebral tumour associated with depression, more than one-third had meningiomas, although this tumour accounts for less than a quarter of all intracranial neoplasms. The relationship between meningioma and mood change is not understood, but as these tumours appear capable of stimulating a cell-mediated immune response (Pees and Seidel, 1976) one might have to consider the effect of such antibodies on cerebral mechanisms. The possibility of meningiomas being induced by viruses (Smith *et al*, 1974) may be another clue to better understanding of depressive illness in association with meningioma. Depression following virus infection is a common enough phenomenon, and recent studies (Rimon *et al*, 1971; Lycke *et al*, 1974) give further support to a possible linkage between such infections, depression and tumour formation.

Clearly a great deal needs to be done before we gain more than a minimum of understanding of the nature of cancer-brain interactions. As Brown *et al* (1974) have remarked, 'There are complex relationships between cancer and mental state of which the most readily understandable are the psychological reactions of patients with established malignancy. More speculative . . . is the possibility that psychological states may predispose to the development of cancer.'

In this respect one can only wonder to what extent Freud's grief at the loss of his grandson, so movingly described by Ernest Jones (1957) impaired his resistance to his own cancer which finally ended his life some sixteen years later. The stresses of these years were very considerable and the recurrence of cancer shortly after the death of his mother may have been more than a chance coincidence. The aphorism, 'No happy man dies from cancer' may not be so speculative today as it was when it was uttered.

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