Is there a link between work-related stress and colorectal cancer?

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The South Australian Workers Compensation Tribunal has found that stress contributed to a man's colorectal cancer. The medical evidence for this is very limited, and the case highlights the difference between scientific and legal proof. ***(MJA 2004; 180: 339-340)***

THE SOUTH AUSTRALIAN Workers Compensation Tribunal has concluded, on the basis of the evidence presented to it, that workplace stress contributed to the development of colorectal cancer in a prison officer.[1] This finding highlights the role of the adversarial legal system, in which courts and tribunals are generally limited by the material the parties choose to present.[2] However, this subtlety was not reflected in the subsequent media coverage, with headlines such as "Work and stress — judge finds a deathly link" and lines such as "A judge has accepted that a prison officer's job stress contributed to the cancer that killed him in a ruling that threatens to unleash a series of cases…".[3]

It is therefore pertinent to review the medical history on which the decision was based and the medical literature to see whether this putative link should be challenged, despite the lack of an appeal by the South Australian Crown Solicitor's Office.[3]

Medical history

The prison officer was employed by the South Australian Department of Correctional Services for 21 years, from 1977 to 1998. A diagnosis of colorectal cancer, resulting in resection of an advanced colon cancer of the caecum (Dukes' C stage), was made at age 59 years, and the man died in 1998 aged 60 years. The prison officer's father had died of colorectal cancer when 75 years old, with age at onset of his cancer unknown.

The Tribunal noted the influence of inheritance in the development of colorectal cancer, but several factors invite comment. First, there is no indication whether a detailed family history had been obtained, for example by a family cancer service. It is well documented that history-taking by individual practitioners misses a substantial number of relatives affected by cancer.[4,5] Moreover, the decision does not indicate whether the cancer tissue was submitted for genetic testing, which could provide objective evidence of inherited risk through immunohistochemistry and microsatellite instability testing.[6]

Medical literature review

The Tribunal described the "considerable examination of relevant literature" by the various medical experts as a key dimension of the case.[1] Four main studies were cited.[7-10]

One study compared 551 individuals with colorectal cancer with 1861 controls.[7] The authors concluded that "logistic analysis yielded hypotheses for colon cancer risk in males with potentially high exposure to solvents, abrasives and fuel oil and in those in jobs with . . . high stress".[7]

A study by Courtney et al, involving 569 cases and 510 controls, revealed a strong association between a history of work-related problems and colorectal cancer.[8] The odds ratio was 5.5 (95% CI, 2.3–23.5). The authors, explaining the wide confidence interval, stated that "because most of the events were relatively uncommon in this population, the estimates of effect were not precise".[8]

Courtney et al subsequently reported another case–control study involving 774 pairs, again examining the relationship of job stress and risk for colon cancer.[9] Participants in the highest-stress group had a slightly increased risk when compared with those in the lowest-stress group (odds ratio, 1.3; 95% CI, 1.0–1.6), but there was no evidence of a trend. The authors concluded that "if job stress, as reflected by perceived job demand or control, is a determinant of colon cancer, it is probably not a strong one".[9]

The applicant for compensation (the prison officer's widow) also relied on a study by Kune et al of 715 patients with colorectal cancer and 727 controls (data from the Melbourne Colorectal Cancer Study).[10] Work problems were found to be significantly more common for colorectal cancer patients. Although recall bias was not completely controlled for, it was thought that it was "probably not an important factor".[10]

Other articles by Kune et al were not cited by the applicant or by the prison officer's employer (the respondent).[11,12] One of these papers used data from the Melbourne Colorectal Cancer Study to evaluate the effect of personality on risk of colorectal cancer in 637 individuals with colorectal cancer and 714 controls. Questions that tested a particular personality profile with regard to cancer risk revealed a significant association between a particular personality type and risk of colorectal cancer. With the caveat that the results should be cautiously interpreted, Kune et al concluded that

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the data were consistent with the hypothesis that "personality type may play a role in the clinical expression of colorectal cancer".[11] Yet further data from the same study revealed that significant protection against colorectal cancer was associated with self-reported "religiousness".[12] How these findings might have affected the Tribunal's decision is unknown.

This selective use of data is a feature of the adversarial system in which "parties are not obliged to call all the relevant evidence . . . only that which favours their case".[2] Indeed, our review here may be similarly criticised for presenting further selective references. Although a comprehensive review of the factors that contribute to the occurrence and effective management of workplace stress exists,[13] an objective and complete review of the medical literature with regard to stress and colorectal cancer has yet to be published.

Other literature before the Tribunal included a review of evidence concerning any relationship between the mind and cancer.[14] This review noted that "there is very limited evidence that either stress or depression are risk factors for the onset of cancer". It concluded that:

> On balance, the findings suggest that some psychological factors probably do exert an influence on the onset and cause of cancer, but the extent of their influence is unknown. Clearly further research and replication studies are needed to clarify the nature of this relationship.[14]

Legal proof

Samuels, writing in the Journal in 1998, provided a detailed outline of the differences between medical truth and legal proof. Commenting that the question to be answered in our adversarial legal system is not "What is the truth of the matter?", Samuels conceded that "medicine is a science and law is not".[2]

Causation in science has multiple defined criteria (such as strength and consistency of association, temporal association, specificity, dose–response relationship, known or theoretical mechanism and coherence of evidence).[15] Causation in law has a different basis, being "determined as a matter of common sense", so that an inference of causation in a legal sense may be drawn when the level of evidence may be insufficient for causation according to the scientific criteria described above.[16] A medical fact is "one which can be empirically supported", whereas a legal fact "is one which is more probable than other countervailing facts".[2]

It appears from the Tribunal's reasons for its decision that, whereas the respondent's medical expert tried to use a scientific standard of proof in examining the evidence for a contribution of stress in cancer, the Tribunal was only concerned with the balance of probabilities.

Conclusion

To date, the association between stress at work and colorectal cancer has been the subject of a limited number of conflicting and inconclusive studies. The decision made by the Tribunal turned on the medical and other evidence actually placed before it by the parties.

In finding that on the balance of probabilities the prison officer's employment contributed to his cancer, the Tribunal found it unnecessary to distinguish between causation and acceleration. Thus, the fundamental causation issue has *not* been subject to legal precedent. It will be of considerable interest to consider any further cases in which the question might again arise, especially in light of the then current state of relevant scientific evidence.

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