
RESPONSE: de Divitiis, et al., state that we did not mention their previously published work on sellar reconstruction in our article on transphenoidal surgery. We regret the omission. They recommend osteoplastic opening of the sella and reconstruction of it with bone. We have clearly shown in our large series that the same goal can be achieved using only resorbable material. We also recommend packing the sella loosely in cases of micro- and mesoadenomas, and we had no instances of damage to the optic pathways or the oculomotor nerves in our series. Finally, de Divitiis and colleagues recommend against using spinal drainage. In many neurosurgical centers it is common practice to use spinal drainage as the first therapeutic option in cerebrospinal fluid (CSF) leakage after having performed any skull base procedures, and it very often helps to avoid an operative repair. Therefore, we strongly recommend the use of spinal drainage in cases of CSF leak.

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Gender and Traumatic Brain Injury

TO THE EDITOR: The metaanalysis regarding the outcome of women following traumatic brain injury (TBI) by Farace and Alves (Farace E, Alves WM: Do women fare worse: a metaanalysis of gender differences in traumatic brain injury outcome. J Neurosurg 93:539–545, October, 2000) has raised serious questions regarding the suitability of the included reports.

Abstract

Object. The purpose of this metaanalysis was to investigate possible gender differences in traumatic brain injury (TBI) sequelae. The case fatality rates in patients after TBI have previously been shown to be significantly higher in women as compared with men.

Methods. A quantitative review of published studies of TBI outcome revealed eight studies (20 outcome variables) of TBI, in which outcome was reported separately for men and women.

Conclusions. Outcome was worse in women than in men for 85% of the measured variables, with an average effect size of -0.15. Although clinical opinion is often that women tend to experience better outcomes than men after TBI, the opposite pattern was suggested in the results of this metaanalysis. However, this conclusion is limited by the fact that, in only a small percentage of the total published reports on TBI outcome, was outcome described separately for each sex. A careful, prospective study of sex differences in TBI outcome is clearly needed.

According to my experience, patients with severe TBI and patients suffering from postconcussive symptoms are very different populations and, therefore, cannot be included together in a metaanalysis. Regardless, the authors found that the mean effect size is small (0.15), which raises doubts about the meaning of the whole study. In a more recent study, Groslasser, et al., found that female patients with severe TBI recovered better than male patients. The outcome parameter used in this study is return-to-work status, which is an integrative outcome parameter and well related to the overall quality of life of patients with TBI. The authors also found that female patients with TBI fare better than male patients in this integrative parameter.

The authors mention the possible effect of sex hormones; however, they tend to emphasize the possible negative effect of estrogen whereas the well-documented protective effect of progesterone in experimental brain injury, although mentioned, is less emphasized.

It is well known that genetic factors like the apolipoprotein E-epsilon4 genotype may play a role in recovery from TBI and that gender differences may play an important role. However, as the data exist at the moment, including the data presented by Farace and Alves, women with TBI appear to experience a better quality of life as expressed by the return-to-work outcome parameter.

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References

J. Neurosurg. / Volume 94 / May, 2001

Neurosurgical forum
RESPONSE: We thank Dr. Groswasser for his insightful comments. This reply allows for further clarification of the intent of our previous report that notes the importance of investigating the impact of patient gender on TBI outcomes. The original article’s statement regarding the protective effect of progesterone is well taken, and further highlights the importance of investigating the relationship between gender and TBI outcome. Dr. Groswasser is also correct in pointing out the limitation of combining a range of outcomes in a single metaanalysis (for example, mild to severe TBI), and indeed a number of subgroup analyses would have been interesting. However, this analysis was not possible given the paucity of studies reporting TBI outcomes by gender. Patient gender probably interacts with outcomes through complicated physiological and psychological mechanisms; but given that less than 1% of TBI research results are reported separately by gender, the true gender effect on outcome in patients with TBI cannot be known until it is routinely and directly investigated.

Dr. Groswasser has reported in his letter that female patients with TBI recovered better than male patients, with return-to-work as the outcome parameter. However, in the original article, return-to-work was only predicted at the time of discharge from rehabilitation, whereas actual rates of return-to-work were not measured. Although physician’s estimation of return-to-work status is frequently used in clinical rehabilitation settings, this prediction is potentially subject to significant bias. Subjectivity is a particular concern when it comes to evaluations influenced by gender roles, such as job performance. A more objective outcome measure would have been an actual measure of the patients’ return-to-work status. Given the subjectivity of predicted return-to-work as an outcome measure, there has been a recent movement in the rehabilitation literature recommending the use of objective outcome measures with importance placed on patient-centered outcomes.

Return-to-work is a complicated outcome measure that has different meanings for men and women; probably due more to psychosocial factors than to physical factors. For example, employment is associated with perceived health status and lower rates of depression in women but not in men. Women are more likely than men to work part-time, particularly if young children are in their family, which is arguably a simpler work status to which to return. In terms of their career advancement and earnings, women pay a higher price than men for their absence from work, especially if they have already lost time because of maternity leave. Women earn less money than men, even after controlling for education, age, position level, and job tenure, and the less income a person earns, the earlier they need to return to work, especially if they are the sole source of income for the household. Women receive a large portion of their social support from other relatives, friends, and coworkers, and thus, women may be motivated to return to work to receive additional social support. Women often adopt the caregiver role and primary responsibility for the household and family. Women are much more likely than men to actively work on household tasks when at home, rather than resting or spending leisure time, so that time spent at home is less restful for women. Last, given the work-related discrimination to which some women are sometimes exposed, women may be particularly motivated to avoid a second basis of discrimination for a disability.

Return to work before full recovery may in fact lead to worse outcomes in women. Thus, although Groswasser and colleagues theorize that predicted return-to-work is a good marker of quality of life, the reliability and validity of this comparison has not been established. If women with TBI have presentations and treatments different from those of men, of course such factors could lead to outcomes in women that are different from those in men. An example of this problem is shown by the impact of gender on women’s outcomes in acute myocardial infarction (MI) wherein women differ not only in risk, but also in symptom presentation, treatment, and outcomes. During an acute MI, men are less likely to complain of neck pain, back pain, jaw pain, or nausea than women, and women are less likely to report diaphoreses than men. Women with acute MI arrive later at the hospital, are less likely to be immediately given aspirin therapy, have longer door-to-treatment times, and on discharge are less likely to be prescribed beta blockers for secondary prevention. Last, women are more likely to die following an MI than men, even after adjustment for patient age and more unfavorable risk profiles. Women with acute MI who are younger than the age of 50 years have a mortality rate three times higher than that of men. Thus, that question posed in the title—“how does the fairer sex fare?”—is unknown. Rather than considering this metaanalysis, the final word on the subject, our intent is to encourage researchers in clinical trials and investigator-initiated research to use objective, reliable, and valid outcome measures, and to analyze their data separately by gender. Further research will thereby reveal the true patterns of the effect of gender on TBI outcomes. If women truly have worse outcomes, as recently supported by evidence of higher frequency rates of post-concussive symptoms in women with mild TBI to higher fatality rates in women with severe TBI, we will raise the index of suspicion if a female patient presents with TBI and thus improve outcomes.

References

2. Bazarian JJ, Wong T, Harris M, et al: Epidemiology and pre-