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Clinical Article

Quality of life in adult patients with primary intracranial arachnoid cysts

T. Spansdahl[1], **O. Solheim**[2]

[1] Faculty of Medicine, Norwegian University of Science and Technology, Trondheim, Norway
[2] Department of Neurosurgery, St. Olavs University Hospital, Trondheim, Norway

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Summary

Background. Primary arachnoid cysts are benign developmental lesions of arachnoid mater. Arachnoid cysts may be detected due to various neurological symptoms, or they may be encountered as incidental findings of neuroimaging. Consequently, a significant share of the patients seems asymptomatic. There are diverging opinions about the clinical importance of cyst sizes, cyst location and degree of volume reduction after surgery, hence contributing to controversies regarding indications for surgical treatment. We present the first study assessing internationally established parameters of quality of life and mental health in a clinical-outcome analysis of adult patients with arachnoid cysts.

Method. Ninety-two adult patients with arachnoid cysts who had been referred to our department over the last 16 years were included. Forty-seven patients had undergone surgery and 45 patients had not been operated on. Data for analysis was based on both medical records and questionnaires sent out by mail. Quality of life was assessed by the Short Form 36 Health Survey (SF-36), and mental health was further evaluated by the Hospital Anxiety and Depression Scale (HADS). Seventy-one percent of patients responded to our questionnaires.

Findings. There was a great variation in the presenting symptoms, seemingly without any relation to cyst localisation. Patients with arachnoid cysts seem to have a reduced quality of life and a very high prevalence of anxiety compared to a healthy normal population. Men presented lower outcome scores than women. Subjects with symptoms, that we retrospectively labeled biologically comprehensible, tended to have higher quality of life, less anxiety and better subjective symptom relief after surgery.

Conclusion. Our arachnoid cyst population had a low employment status, decreased quality of life scores and prevalent symptoms of anxiety. We argue that the arachnoid cysts are, in most cases, not directly related to these studied parameters. We speculate that our findings may reflect the demographic characteristics of adults likely of being diagnosed with incidental cysts. A better clinical outcome for patients with biologically plausible symptoms supports a neurobiological approach in the selection of patients suited for surgery.

Keywords: Arachnoid cyst; quality of life; anxiety; depression.

Introduction

Primary intracranial arachnoid cysts are benign congenital malformations of the arachnoid mater containing cerebrospinal fluid [16, 17, 24, 25, 28]. They are most often diagnosed during childhood and adolescence [3, 12].

Adult patients may present a variety of different symptoms. However, incidental radiological findings are often encountered in asymptomatic patients. With the increasing use of modern diagnostic imaging, this patient group

Correspondence: Ole Solheim, MD, Department of Neurosurgery, St. Olavs Hospital, N-7005 Trondheim, Norway. e-mail: ole.solheim@stolav.no

has grown significantly [1, 7, 27]. One may be puzzled by the fact that there may be a total lack of symptoms despite enormous space occupying lesions [6].

Selecting eligible candidates for cyst surgery is challenging due to an often unclear relationship between the presented symptoms and image findings. Our department policy has, for several years, been to offer treatment to patients thought to have signs and symptoms of intracranial hypertension, focal neurological signs or symptoms possibly caused by local mass effect or associated complications such as intracystic bleeding or subdural hygroma. There is some consensus in the neurosurgical community supporting these somewhat vague selection guidelines [5, 14, 20, 22]. Asymptomatic patients are usually not operated on. However, patients with atypical but disabling symptoms are sometimes offered surgery as well.

Some surgical departments justify an even more conservative approach, offering treatment to a very limited group of patients. This is supported by studies finding no correlation between cyst size, cyst location, cyst volume reduction after surgery and the clinical presentation [2, 9, 27].

A more controversial strategy is practiced in yet other centres, recommending that all cysts should be operated on. The arguments are to prevent complications due to cyst rupture and to target a possible reversible dyscognition due to compressed neural parenchyma [23].

Which factors eventually affect the clinical outcome is an ongoing debate, and there are many concurrent views of opinion.

As far as we know, no former study has ever used internationally established parameters of quality of life in an outcome analysis of patients with arachnoid cysts. Of all 92 patients included in this study, 47 had undergone surgery and 45 had not. We have attempted to evaluate the quality of life and mental health of these patients in relation to preoperative clinical characteristics. Quality of life at follow-up was assessed by the Short Form 36 Health Survey (SF-36), and mental health is further evaluated using the Hospital Anxiety and Depression Scale (HADS).

Methods and materials

Objective

To evaluate symptoms of anxiety, depression, ability to work and general quality of life in an adult patient population with arachnoid cysts.

Study design

From both operation and medical records we identified and included 92 adult patients who had been evaluated or treated for primary intracranial arachnoid cysts in the period from 01.01.1991 to 31.08.2006. Forty-seven had undergone surgery (41 fenestrations, 3 shunts, 3 primary fenestrations with secondary shunting) and 45 had not due to asymptomatic presence or lack of comprehensible symptoms.

Data was recorded from both medical records and questionnaires. The questionnaires were sent by mail, and subjects who had not responded within a period of three weeks received a written reminder including a new copy of the questionnaire. The study was approved by the Regional Ethics Committee (REC) and the Norwegian Social Science Data Services (NSD).

Parameters registered

We registered a number of parameters from the medical records: (i) age, (ii) sex, (iii) date of clinical evaluation or operation, (iv) symptoms leading to first radiological examination, (v) intracranial location of cyst, (vi) appearance of cyst, (vii) complications due to surgery, (viii) re-operations and (ix) symptoms at postoperative outpatient control.

We registered the following data from the questionnaires: 1) employment status both before evaluation/operation and after operation, 2) educational status, 3) subjective outcome after surgery: less/unchanged/worse symptoms, 4) regrets after undergoing treatment: yes/no, 5) the quality of life was assessed by the Norwegian translation of SF-36. The 36 items are scored as eight scales: physical functioning, social functioning, role limitations due to emotional and physical problems, body pain, mental health, vitality and general health perception and 6) symptoms of anxiety and depression were assessed by the Hospital Anxiety and Depression Scale (HADS).

Statistical analyses

Data was analysed using SPSS vs. 13.0 for Windows. Mann-Whitney *U*-test was used to compare differences between two independent non-parametric samples of continuing variables. Chi-square-test was used to compare differences between categorical non-parametric samples. *P*-values less than 0.05 were considered significant.

Results

Patient characteristics

The patient characteristics are listed in Table 1. Our study includes 47 women and 45 men. Mean age at admission was 40. 65 of 92 patients (71%) returned our questionnaire, of which 32 had undergone surgery and 33 had not.

The female sex ratio was 51% of the total patient population and 60% in the responding group. The most frequent cyst location was the middle cranial fossa (47%), followed by posterior fossa (25%), frontal fossa (11%), basal midline (11%), occipital (4%) and parietal (2%).

Despite a slightly higher rate of response among female patients, there were no significant differences between questionnaire responders and the total patient population. There were also no significant differences between the operated- and the non-operated group of inclusion when comparing age, gender, educational status or cyst location.

Employment status

Employment status before and after surgery is listed in Table 2. There were no significant differences between male and female patients. Only 53% of the patients were in full-time employment when undergoing the initial clinical evaluation (excluding students, retired patients and missing data). The percentage of the full-time employed did not change after surgery.

Table 1. *Patient characteristics*

Characteristics	Operated		Non-operated	
	$n=47$	$n=32$*	$n=45$	$n=33$*
Age at admission				
– mean	38.9	41.2	41.0	41.0
– range	15–80	16–80	13–74	13–74
– SD	±15.5	±17.1	±14.8	±15.2
Female sex – no. (%)	22 (47)	16 (50)	25 (56)	23 (70)
Educational status – no. (%)				
Primary school (10 yrs)	6 (13)	6 (19)	3 (7)	3 (9)
Trade school (3 yrs)	13 (28)	9 (28)	14 (31)	13 (39)
High school (3 yrs)	7 (15)	6 (19)	5 (11)	5 (15)
University <4 yrs	10 (21)	6 (19)	8 (18)	6 (18)
University >4 yrs	5 (11)	5 (16)	5 (11)	5 (15)
Missing	6 (13)	0 (0)	10 (22)	1 (3)
Location – no. (%)				
Temporal	23 (49)	17 (53)	20 (43)	11 (33)
Posterior fossa	10 (21)	8 (25)	13 (28)	11 (33)
Frontal	6 (13)	3 (9)	5 (11)	3 (9)
Occipital	1 (2)	1 (3)	3 (7)	3 (9)
Parietal	0 (0)	0 (0)	2 (4)	2 (6)
Basal midline	7 (15)	3 (9)	3 (7)	3 (9)

* Questionnaire respondants.

Table 2. *Employment status before and after surgery ($n=47$)*

Status	Before surgery – no. (%)	At follow-up – no. (%)
Unemployed	1 (2)	2 (4)
Rehabilitation	3 (6)	1 (2)
Reported sick	12 (26)	8 (17)
Full-time employment	19 (40)	18 (38)
Disability insurance	1 (2)	5 (11)
Student/retired	10 (21)	7 (15)
Missing	1 (2)	6 (13)

Complications and re-operations

A total of 7 patients (15%) experienced postoperative complications, none of which were fatal. Four of these 7 patients received further surgery; two due to subdural hygroma and two due to intracystic postoperative haemorrhages. In addition, a total of 8 patients received further surgery due to a later relapse in symptoms and residual cyst expansion. One patient had developed epileptic seizures at follow-up.

Symptoms leading to diagnosis and status at follow-up

Table 3 shows the varying symptoms leading to the diagnostic imaging. Patients who had undergone surgery

Table 3. *Presenting clinical picture ($n=65$)*

Symptom or finding	Operated – no. (%)	Non-operated – no. (%)	Total – no. (%)
Headache	24 (75)	17 (52)	41 (63)
Dizziness	22 (69)	17 (52)	39 (60)
Unsteadiness	17 (53)	10 (30)	27 (42)
Reduced concentration ability	12 (38)	10 (30)	22 (34)
Visual disturbance	12 (38)	6 (18)	18 (28)
Memory deficit	8 (25)	5 (15)	13 (20)
Hearing disturbance	8 (25)	2 (6)	10 (15)
Dysphasia	5 (16)	6 (18)	11 (17)
Asthenia	5 (16)	4 (12)	9 (14)
Nausea/vomiting	5 (16)	3 (9)	8 (12)
Trauma*	2 (6)	5 (15)	7 (11)
Seizures	4 (13)	3 (9)	7 (11)
Dysaesthesia	4 (13)	1 (3)	5 (8)
Depression†	2 (6)	1 (3)	3 (5)
Dyslexia	4 (13)	2 (6)	6 (9)
Dysmotility	1 (3)	4 (12)	5 (8)
Anxiety†	1 (3)	0 (0)	1 (2)
Unspes. mental illness†	1 (3)	2 (6)	3 (5)
Psychosis†	0 (0)	1 (3)	1 (2)

* Cyst discovered incidentally after trauma; † cyst revealed during diagnostic mapping of mental illness.

Table 4. *Symptoms leading to diagnosis and continued complaints at follow-up*

Complaints	Symptoms leading to diagnosis – no. (%)			Continued complaints at follow-up – no. (%)		
	Operated ($n=32$)	Non-operated ($n=33$)	All ($n=65$)	Operated ($n=32$)	Non-operated ($n=33$)	All ($n=65$)
Headache	24 (75)	17 (52)	41 (63)	10 (31)	10 (30)	20 (31)
Dizziness	22 (69)	17 (52)	39 (60)	10 (31)	11 (33)	21 (32)
Unsteadiness	17 (53)	10 (30)	27 (42)	7 (22)	5 (15)	12 (18)
Reduced concentration ability	12 (38)	10 (30)	22 (34)	6 (19)	7 (21)	13 (20)
Visual disturbance	12 (38)	6 (18)	18 (28)	6 (19)	3 (9)	9 (14)
Hearing disturbance	8 (25)	2 (6)	10 (15)	6 (19)	1 (3)	7 (11)
Seizures	4 (13)	3 (9)	7 (11)	2 (6)	0 (0)	2 (3)
Dyslexia	4 (13)	2 (6)	6 (9)	2 (6)	2 (6)	4 (6)
Dysphasia	5 (16)	6 (18)	11 (17)	1 (3)	0 (0)	1 (2)

had more initial complaints (average 4.3 symptoms per patient) than the non-operated group (average 3 symptoms per patient). Headache was the most frequent complaint (63%), followed by dizziness (60%) and unsteadiness (42%). A major share presented symptoms of dyscognition (reduced concentration ability (34%) and subjective memory deficit (20%)). Eight responding patients had a known mental illness, having their cysts revealed during routine psychiatric diagnostic imaging. Seven patients were diagnosed incidentally after admission for head trauma.

Twenty-seven patients (84%) reported symptoms of improvements after surgery. Four patients (13%) had no subjective improvement after surgery and one patient (3%) reported getting worse. Three patients (9%) expressed regrets at having undergone the operation.

Table 4 shows the prevalence of the most common symptoms at diagnosis and at follow-up. Both the operated and the non-operated patients had experienced a similar symptom relief at follow-up. A considerable share in both patient groups still had the same complaints at follow-up.

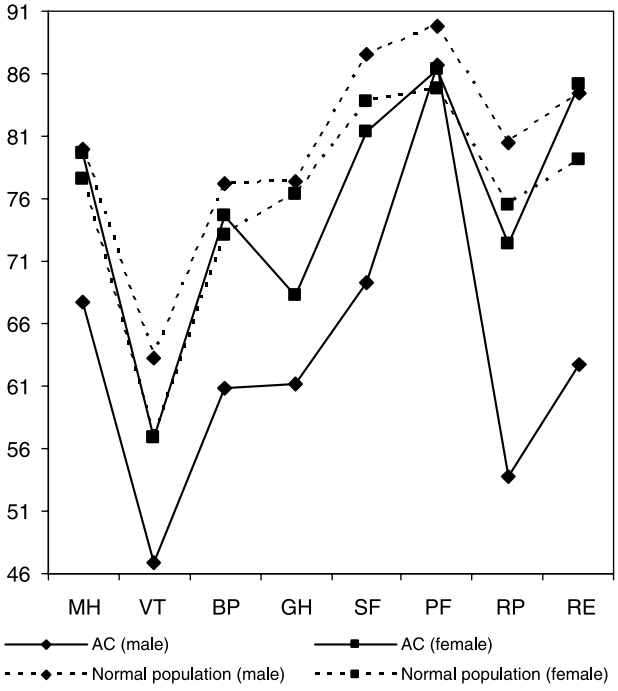

Fig. 1. Mean SF-36 scores in our patient population compared to a normally distributed population. *AC* Arachnoid cyst, *m* male, *f* female, *MH* mental health, *VT* vitality, *BP* bodily pain, *GH* general health, *SF* social functioning, *PF* physical functioning, *RP* role physical, and *RE* role emotional

Quality of life and SF-36

Figure 1 demonstrates the mean quality of life scores in our study. Men in our population scored significantly lower in all scales compared to an age-adjusted normally distributed Norwegian population ($p<0.01$), except for physical functioning. The most significant difference from normal controls was found for vitality ($p<0.0005$). Women in our study presented approximately the same score-distribution as an age-adjusted normal population, except for general health where women with arachnoid cysts have significantly poorer scores ($p<0.04$). Men in our study had a significantly lower quality of life than women ($p<0.04$). This trend is opposite compared to the pattern of a normal population [18].

There was no significant statistical difference in quality of life of operated versus non-operated patients.

Anxiety and depression

The distribution of HAD scores in the operated- and the non-operated population is listed in Table 5. A total of 21 (32%) of our questionnaire respondants had an anxi-

Table 5. *Anxiety and depression (n = 65)*

HAD scores	Operated – no. (%)			Non-operated – no. (%)		
	m ($n = 16$)	f ($n = 16$)	b ($n = 32$)	m ($n = 10$)	f ($n = 23$)	b ($n = 33$)
Anxiety score						
– mean	7.6	3.8	5.7	5.2	5.8	5.6
– score 8–10	5 (31)	2 (13)	7 (22)	2 (20)	4 (17)	6 (18)
– score ≥11	3 (19)	2 (13)	5 (16)	1 (10)	2 (9)	3 (9)
– missing data	0 (0)	0 (0)	0 (0)	0 (0)	1 (4)	1 (3)
Depression score						
– mean	4.5	1.2	2.8	2.9	2.3	2.5
– score 8–10	3 (19)	0 (0)	3 (9)	0 (0)	0 (0)	0 (0)
– score ≥11	1 (6)	0 (0)	1 (3)	0 (0)	0 (0)	0 (0)
– missing data	0 (0)	0 (0)	0 (0)	0 (0)	1 (4)	1 (3)
Total HAD score						
– mean	12.1	5.0	8.6	8.1	8.1	8.1
– HAD 15–18	4 (25)	1 (6)	5 (16)	1 (10)	1 (4)	2 (6)
– HAD ≥19	1 (6)	0 (0)	1 (3)	0 (0)	1 (4)	1 (3)
– missing data	0 (0)	0 (0)	0 (0)	0 (0)	1 (4)	1 (3)

m Male, *f* female, *b* both genders, *score* 8–10 possible case of anxiety or depression, *score* ≥11 certain case of anxiety or depression, HAD 15–18 possible case of either anxiety or depression, HAD ≥ 19 certain case of either anxiety or depression.

ety-score ≥8, a prevalence approximately three times higher than in the general population [13]. Eight patients (12%) had an anxiety-score ≥11 points, indicating that psychological treatment is required. Thirteen patients (20%) had anxiety-scores between 8 and 10, indicating possible cases of anxiety. One patient had a depression-score ≥11 points, indicating that psychological treatment is required. Three patients (5%) had depression-scores between 8 and 10, indicating possible cases of depression. Two patients (3%) had a total HAD-score ≥19 points, indicating certain case of either anxiety or depression. Seven patients (11%) had total HAD-scores between 15 and 18, indicating possible cases of either anxiety or depression. Symptoms of anxiety and depression were significantly more frequent among men than among women ($p < 0.01$). This is in contrast to a normally distributed Norwegian population [13]. There were no significant differences between anxiety- or depression-scores in the operated- and the non-operated patient series.

Subgroup analysis of patients presenting neurobiological plausible symptoms

Thirty-two of our 65 questionnaire responders underwent surgery. Twenty-one of these patients (66%) had symptoms that we retrospectively labeled *biologically plausible* based on the primary clinical evaluation. These patients had symptoms of intracranial hypertension or local mass effect that neuroanatomically could be related to the radiological findings. A patient with ataxia and a cyst compressing the cerebellum would, for example, be labeled plausible, whereas a patient with a hearing disturbance and a small, far frontal cyst would not. This so-called neurobiologically plausible group was compared to other patients who underwent surgery. We found (i) There was significantly less depression ($p < 0.02$). The anxiety- and total HAD-scores tended to be lower, but the differences were not significant, (ii) self-reported clinical outcome was significantly better ($p < 0.04$) and fewer patients regretted the operation ($p < 0.04$)and (iii) the quality of life scores tended to be higher, but the only significant difference was for role physical ($p < 0.004$).

Subgroup analysis of patients with high quality of life scores

Fourteen of 65 patients (22%, 3 men, 11 women) scored higher than the mean values of all eight multi-item scales of SF-36 and were therefore presumed to have a relatively good quality of life. We compared these patients with the rest of the responders, hoping to discover any factor that may have an influence on quality of life. Surprisingly, none of our recorded parameters (mean age, age at admission, gender, operation status, employment status, location of cysts, presenting symptoms, complications, highest level of education) were significantly different in this subgroup compared to the rest of the patients. Nonetheless, there were some ten-

dencies in the subpopulation with 'good' qualify of life: (i) More had a full-time job at admission (57% vs. 45%), (ii) a higher percentage had biological plausible symptoms (50% vs. 31%), (iii) less with primary school as highest educated level (7% vs. 16%) and (iv) fewer had undergone surgery (43% vs. 51%).

Discussion

Disagreements concerning the clinical significance of cyst sizes, cyst locations and degree of volume reduction after surgery contribute to controversy regarding the treatment and clinical follow-up of adults with arachnoid cysts. The presented symptoms are often many and unspecific, thus adding to the challenge of making a rational selection of patients suited for cyst surgery. When there is an asymptomatic presence of arachnoid cysts in adults this may be explained by stable cyst sizes and slow, if any, expansion rates [4, 11, 19, 21]. The brain parenchyma may, therefore, adapt to its neighbouring mass lesion.

Our study indicates that adults with arachnoid cysts often have symptoms of anxiety and have a somewhat reduced quality of life compared to a normal population with the same age and sex distribution. Perhaps most noteworthy are the anxiety-scores, suggesting a possible need for psychological assistance for as many as 32% of our questionnaire responders. The depression-scores, on the other hand, are no higher than in a normal Norwegian population [29]. Similar findings of anxiety and reduced quality of life have been found in patients with incidental intracranial aneurysms [26]. Mean SF-36 scores of general health, vitality, social functioning and physical role are generally lower, indicating a poor evaluation of own health status with possible social handicaps, despite a close-to-normal physical function. In particular, men with arachnoid cysts seem to have significantly lower quality of life. Symptoms of anxiety, depression or quality-of-life scores were similar in the operated-and the non-operated patient group. It is obviously unfair to compare these two groups statistically, since the treatment was not randomised, but based on the surgeons' selection. Another obvious limitation is our retrospective study design was a lack of preoperative or pre-evaluation quality-of-life scores. In the absence of a complete image database we could not evaluate cyst sizes in relation to the parameters studied. Another weakness is our variable time of follow-up. There is also a lack of magnitude-scores of the different symptoms, making it hard to say whether there was a relative relief of the different symptoms or not. Due to the limitations of the study, we are not able to explain our findings; hence, we are left to speculate.

As with most surgical procedures, there are different treatment options. In our department, craniotomy is usually the primary choice when operating arachnoid cysts. This choice of craniotomy before shunting will certainly affect the type, and possibly the number, of complications seen in our patient series. This could further affect outcome parameters. Still, looking at traditional outcome scores, 84% of our questionnaire respondants reported some relief of symptoms after surgery, making our surgical success-rate comparable to other neurosurgical centres [1, 3, 10, 15]. Thus, a poor quality of surgical treatment is not a possible explanation behind our findings.

Most neurosurgeons who treat arachnoid cysts meet patients who undoubtedly benefited from surgical treatment and likewise some who did not. Despite the encouraging subjective improvement reported in our operation series, many still had similar complaints at follow-up. Interestingly, patients who did not receive surgery also reported a major reduction in the number of complaints at follow-up. One always has to remember that a degree of subjective relief from surgery may be influenced by placebo effects, since even sham surgical intervention often cause marked response rates [8, 30]. Arachnoid cysts may be diagnosed when patients undergo imaging procedures due to unrelated symptoms. Such symptoms might increase due to the stress of being diagnosed with an intracranial lesion. Anxiety-scores at the initial clinical evaluation are unfortunately not known, but one has to guess that the prevalence of anxiety may have been even higher than at follow-up. A large epidemiological study documents a significant relationship between anxiety, depression and different functional somatic symptoms [13]. From this, it can be speculated that many patients with arachnoid cysts are selected for surgery based on a clinical evaluation when their psychological and somatic symptoms are peaking.

In addition, persons suffering from anxiety or diffuse somatic symptoms are perhaps more likely to undergo extensive diagnostic imaging and are more often diagnosed with incidental intracranial findings.

Twenty-eight of 92 patients (30%) presented symptoms that we retrospectively labeled biologically plausible. Twenty-five of these 28 had undergone surgery. These patients reported symptoms that neuroanatomically were more comprehensible due to a possible local

mass effect or intracranial hypertension. These patients tended to have less depression, less anxiety and a better quality of life than the rest of the patients who underwent surgery. This could support a neurobiological approach in the selection of candidates suited for cyst surgery.

In conclusion, we found that a wide range of symptoms were often presented at the initial clinical evaluation. The symptoms were seemingly unrelated to the location of the cysts. Surgical intervention often caused subjective improvement, but patients who did not receive surgery also reported a major and almost similar reduction in the number of symptoms at follow-up. We found a low employment status, somewhat decreased quality-of-life scores and prevalent symptoms of anxiety both among patients who had received surgery and those who had not. We believe that these parameters are often not directly cyst related. We speculate that our findings may be influenced by the demographic characteristics of adults likely to be diagnosed with incidental cysts. From subgroup analysis it has been hard to identify symptoms, clusters of findings or cyst localisations that are indicators of a better outcome. However, it seems that patients who present biologically plausible symptoms are less troubled with depression and anxiety and have a better quality of life than the rest of the patients who undergo surgery. This supports a conservative, neurobiological approach in the selection of adult candidates for cyst surgery.

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Comments

Arachnoid cysts are often discovered incidentally, and raise the issue of whether surgery or conservative management is best. The authors studied a sample of patients with arachnoid cysts and used two widely recognised assessments of quality of life and emotional adjustment. Weaknesses of the study include sample biases in the initial recruitment of patients and in the selection of patients for surgery, the lack of a specific comparison group, and the wide range in time to follow-up. These limitations mean that the study does not give a clear answer to the question of the benefits of surgery. On the other hand, the paper presents some interesting and thought provoking findings. First, that in comparison to initial presentation both operated and non-operated patients showed a reduction in the number of symptoms reported at follow-up. Second, that high levels of anxiety were nonetheless relatively common at follow-up. The observation that these latter problems were mainly present in males is puzzling, and has no obvious explanation. The authors argue that most problems reported were pre-existing. However, the stress on the individual of having a cyst diagnosed and the issues that must be faced as a result are also likely to play a role. In any case, the findings indicate relatively high levels of continuing psychological distress in these patients.

L. Wilson
Stirling

Despite the relative simplicity of their surgical management, arachnoid cysts may often represent a dilemma as their clinical presentation may be vague or elusive and the results of their treatment occasionally deceptive even when anatomic goals are achieved. Although decision making may appear as easy for a huge arachnoid cyst causing signs of increased intracranial pressure or in front of a small incidental finding, medium sized lesions associated with chronic headache without specific neurologic signs may give rise to controversies.

In this paper, Spansdahl and Solheim present an interesting attempt of characterisation of subjective feelings of their patients by using quality of life assessment along with an evaluation of their mental health. Using this original approach, they could convincingly define criteria for selection of patients who are unlikely to respond to surgical management, such as the absence of close correlation between presenting symptoms and imaging findings. More importantly, this study has the merit of pointing to some psychological aspects that are often neglected by a more somatic and conventional approach of this lesion. In this regard, one of the most intriguing findings reported by Spansdahl and Solheim is a significantly lower outcome score in men when compared to women. Although the authors could not explain their finding, they nevertheless raise an important question that may be the topic for future studies.

J. F. Soustiel
Haifa