PostScript

LETTERS

Quality of life after decompressive craniectomy for malignant middle cerebral artery infarction

Malignant middle cerebral artery (MCA) infarction is a devastating condition leading to early death in nearly 80% of cases due to the rapid rise of intracranial pressure despite maximum medical management of the ischaemic brain oedema.[1] Decompressive craniectomy (DC) has been proposed to prevent brain herniation in malignant MCA infarction, but it remains controversial in the absence of randomised controlled trials and because of the fear of a severe residual disability after surgery.[1–4] We present herein the results of a quality of life assessment using patient and proxy versions of the Stroke Impact Scale (SIS) in eight patients 12–30 months after craniectomy for malignant MCA infarcts.

Methods

Between March 1999 and November 2000, all consecutive patients with malignant MCA infarction were treated by DC and durotomy at Lariboisière Hospital if they were younger than 55 years of age, had a complete MCA infarct as defined by complete MCA territory CT ischaemic changes, and a severe hemiplegia with altered level of consciousness with further neurological deterioration due to brain oedema, and if a close family member gave informed consent. Exclusion criteria were: prestroke moderate to severe disability defined by a modified Rankin scale (mRS)$\geq$2, haemorrhagic transformation involving more than 50% of the MCA territory, and significant contralateral ischaemia.

Disability was assessed using the mRS and the Barthel Index (BI), and quality of life using the French version of the SIS 2.0.[5] The SIS comprises eight domains, four physical domains (including strength, hand function, mobility, and activity of daily living/instrumental activities of daily living) and four psychosocial domains (including emotion, communication, memory, and social participation) and includes the patient's global assessment of percentage of recovery. The scores of each domain range from 0 to 100, with 100 being the best.

Results

Ten patients were included (eight men and two women, mean (SD) age 41 (12) years, range 15–54). The mean (SD) NIH score scale at admission was 21 (3), range 16–25. Five patients had a left sided stroke with severe aphasia. The mean time between stroke onset and surgery was 65 (68) h, range 12–252. One patient had a late DC because of recurrent MCA infarct at day 9 after the first stroke. All patients had signs of temporal herniation before surgery including uni- or bilateral mydriasis (9/10), Cheynes-Stokes hypoventilation (8/10), or decerebration (6/10). The mean (SD) duration of hospitalisation in the intensive care unit was 22 (20) days, range 3–58. Two patients died, one from a cerebral abscess and the other from a large epidural hematoma.

All living patients (8/10) were followed for a mean (SD) duration of 21 (21) months, range 12–30. All were managed in a specialised stroke rehabilitation unit with a mean (SD) hospital stay of 12 (11) months, range 4–24, after which they returned home with either home rehabilitation facility or day hospital care. At the end of follow up, 7/8 patients had an mRS$\leq$4 (table 1). The mean (SD) NIH score scale was 13 (4), range 8–18. The two youngest patients had the best scores on disability (mRS = 2) and were fully independent for the activities of daily living (BI $\geq$90) (table 1).

The 64 SIS items could be measured in all patients except patient 7 who had severe aphasia (table 1). The proxy version of the SIS was administered to a close relative (five spouses, two parents) or an employed caregiver (one). The mean (SD) patient assessment of global perception of stroke recovery was 59 (16). The score was lower, but not significantly so, in patients with aphasia compared to patients without, both in patient (55 (15) *v* 65 (19), p = 0.48, Wilcoxon test) and proxy (49 (17) *v* 57 (18), p = 0.45, Wilcoxon test) versions of the measurement. The combined mean (SD) physical domain recovery was 48 (16) when assessed by patients and 39 (16) when assessed by proxies. The lowest scaling success rate was for hand function and the highest for emotion domain recovery. However, during the follow up, two patients had a major depressive episode. In addition, one spouse attempted suicide (patient 8). As expected, patients with aphasia had a lower mean (SD) rate of recovery for communication (50 (37)) than those without (91 (14)), although the difference was not statistically significant (p = 0.21, Wilcoxon test). No patient returned to his or her prior employment, although one patient, the youngest (patient 3), returned to school.

Discussion

This study shows that the SIS measurement is applicable to patients with malignant MCA infarction 12–30 months after craniectomy. The patient's assessment of the physical aspects of disability at 12–30 months post stroke was high (all physical domains mean recovery of 48/100). Interestingly, the proxy

Table 1 Domain scores of the SIS questionnaire filled in by seven living patients and eight proxies 12–30 months after decompressive craniectomy

Patients/ age (years)/ sex	mRS-BI*	SIS version	Strength	Hand function	Mobility	ADL/ IADL†	Physical combined score‡	Emotion	Memory	Communication	Participation	% of recovery	Stroke recovery (VAS)
1/23/M	2–95	Patient	60	0	98	85	61	100	95	100	61	75	75
		Proxy	55	0	100	93	62	96	87	100	61	74	70
2/49/F	5–15	Patient	31	0	60	6	24	64	87	75	42	45	40
		Proxy	31	0	47	2	20	69	84	79	28	39	30
3/15/M	2–90	Patient	70	32	100	98	75	93	95	100	91	83	70
		Proxy	55	0	100	93	62	84	100	100	71	75	75
4/45/M	4–85	Patient	55	0	60	47	40	53	60	9	0	40	80
		Proxy	40	0	68	53	40	89	70	40	27	47	40
6/54/F	4–35	Patient	55	28	44	55	46	84	60	43	69	58	80
		Proxy	40	0	36	52	32	84	57	37	67	48	60
7/46/M	4–60	Patient (ND)											
		Proxy	20	0	28	33	20	44	37	29	24	25	10
8/46/M	4–75	Patient	35	24	62	73	49	89	87	97	67	67	70
		Proxy	45	0	48	50	36	82	70	100	60	56	50
9/50/M	4–55	Patient	35	0	70	62	42	67	62	49	49	48	40
		Proxy	50	0	68	55	43	91	72	40	44	51	40
Scale, mean (SD)		Patients	49 (15)	12 (15)	71(21)	61 (30)	48 (16)	79 (17)	78 (17)	67 (35)	54 (29)	59 (16)	65 (18)
		Proxies	42 (12)	0 (0)	62 (27)	54 (30)	39 (16)	80 (16)	72 (19)	65 (32)	48 (19)	52 (17)	47 (22)

*Modified Rankin Scale-Barthel Index; †activity of daily living/instrumental activities of daily living; ‡combined physical score calculated from the strength, hand function, and mobility domain scores.
ND, not done; VAS, visual analogue scale.

assessment of physical domains recovery was lower (39/100) than the patient assessment. In addition, the disability measured by the mRS showed that 6/8 living patients had an mRS>3, which may indicate a poor outcome. It may be that in patients with malignant MCA infarction, the patient version of the SIS overestimates the physical recovery because of cognitive dysfunction including unilateral neglect, anosognosia, or aphasia.

One main concern in malignant MCA infarction is the psychosocial impact of stroke. In our study, the percentage of recovery was good for emotion and memory but moderate for communication and participation. As expected, patients with aphasia had a lower rate of recovery for communication than patients without, though the difference did not reach statistical significance, presumably because of the small numbers. In the same way, the global percentage of recovery was lower, but not significantly, in patients with aphasia than in patients without. Interestingly, the proxy's assessment of psychosocial recovery, though lower, was close to the patient's assessment.

In conclusion, this study shows that after craniectomy for malignant MCA infarcts, even though the perception of physical aspects of disability is high, that of psychosocial impairment is lower. Open series of craniectomy for malignant MCA infarction indicate that surgery decreases death rates. However, randomised trials are needed, taking into account not only death and dependency but also quality of life.

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Cerebral sinus thrombosis in a patient with Cushing's syndrome

It is well known that hypercortisolism induced by Cushing's disease and syndrome, or by administration of glucocorticoids, causes thromboembolic complications.[1] However, the precise mechanisms underlying the hypercortisolism induced hypercoagulable state still remain unknown. Here we describe a case of cerebral lateral sinus thrombosis with Cushing's syndrome. Glucocorticoid induced overproduction of factor VIII and von Willebrand factor (VWF) may have contributed to the development of the cerebral sinus thrombosis in this patient.

Case report

A mildly obese 30 year old woman was admitted to our hospital because of headache and nausea. She was not taking any medications, including oral contraceptives, before admission. The patient had no intracranial hypertension; her fundi showed no papilloedema, and intracranial pressure measured by lumbar puncture was normal (14.3 mmHg). Brain computed tomogram (CT) showed a high density lesion in the left temporo-occipital lobe (fig 1A). Magnetic resonance venogram (MRV) on the first hospitalised day showed a filling defect in the left lateral sinus (fig 1B). These findings were consistent with cerebral lateral sinus thrombosis.

Laboratory data showed elevation of factor VIII (183 %, one stage clotting assay; normal range 60–150%), VWF (275 %; normal range 60–170%), thrombin–antithrombin III complex (15.5 ng/ml), plasminogen activator inhibitor-1 (PAI-1) (123%), and D-dimer (2.1 μg/ml). Other major factors related to coagulation and fibrinolysis, including antithrombin III (112 %), fibrinogen (330 μg/ml), plasminogen (117 %), plasmin-α_2–plasmin inhibitor complex (0.9 μg/ml), protein C (87 %), and protein S (95 %), were within normal limits. Markers of acute phase reaction such as C reactive protein and erythrocyte sedimentation rate were not elevated. Neither antiphospholipid antibodies nor antinuclear antibodies were detected. The patient was treated with intravenous heparin and subsequent oral administration of warfarin potassium. A relative fibrinolytic enhancement following the strict anticoagulation may have caused recanalisation of the lateral sinus, which was confirmed by the follow up MRV (fig 1C). The patient's symptoms disappeared completely.

During the extensive examination of thrombotic causes, we suspected the presence of hypercortisolism because of the presence of central obesity and moon face. As a result, we found a left adrenal tumour, which was accompanied by hypercortisolism (210 μg/l) with suppressed adrenocorticotropic hormone (3 pg/ml). The left adrenal mass showed a high uptake of ^{131}I-adosterol on scintigram. These findings were consistent with Cushing's syndrome. After the laparoscopic left adrenalectomy, the patient received replacement therapy with hydrocortisone for approximately 1 year. Plasma levels of factor VIII and VWF decreased gradually to the normal level (130% and 140%, respectively), 1 year after adrenalectomy.

Discussion

We report the first case of cerebral sinus thrombosis associated with Cushing's syndrome. Thromboembolic complications are well known to occur in the patients with hypercortisolism.[1] Most are deep vein thromboses and pulmonary thromboembolisms. However, there are no reports so far to show association with cerebral sinus thrombosis and Cushing's syndrome.

A few reports suggest that factor VIII and VWF may have roles in the development of thromboembolic complications associated with hypercortisolism.[1] As well as blood group, sex, age, inflammation, and endothelial dysfunction,[2] hypercortisolism is reported to be an important determinant factor for plasma levels of VWF.[1] Huang *et al*[3] showed that dexamethasone stimulated VWF release from cultured human endothelial cells. Factor VIII is mainly synthesised in the liver and secreted to the circulation. Because VWF protects factor VIII from proteases, a concordant increase of factor VIII and VWF in plasma is generally observed.[1 2] Recent studies show that high plasma level of factor VIII (especially over 150%) is an independent risk factor for venous thromboembolism,[2] including cerebral sinus thrombosis.[4] In this patient, considerable elevation of factor VIII and VWF was observed specifically before removal of the adrenal tumor. Thus, hypercortisolism may have enhanced VWF release from endothelial cells to increase factor VIII, thereby causing a hypercoagulable state. The present case also suggests that measurement of factor VIII and VWF may be useful to decide if anticoagulation therapy can be ceased after successful adrenalectomy in Cushing's syndrome. However, because hypercortisolism does not always cause hypercoagulable state, some genetic factors, such as polymorphism of steroid receptor, may determine whether glucocorticoids increase plasma levels of factor VIII and VWF.

It is also reported that PAI-1 is often elevated and may cause thromboembolic complications by lowering fibrinolytic activity in patients with hypercortisolism. The slight but significant elevation of PAI-1 in this case may also have contributed to the thrombus formation. However, factor V Leiden, a common coagulation abnormality in Western populations, may not have participated in thrombus formation in our case, because it is considered that the mutation is not present in the Japanese population.[5]