

Presentation and Outcome of CSDH in Hospital

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Abstract

Aim: To analyse the outcomes of surgical management in patients of chronic subdural hematoma. Study design: prospective

Place of study: Department of Neurosurgery, in tertiary care centre

Methodology: 65 patients of both genders with ages >18 years presented with chronic subdural hematoma were included. Patients detailed medical histories including age, sex and residence were recorded. Patients were categorized according to the Markwalder Grading System. CT scan was done before and after surgery and the discharge time. Outcomes were recorded according to the Glasgow coma scale.

Results: There were 57 (87.6%) male patients and 8 (12.3%) female patients. majority of them presented with headache (61.5%), followed by extremity weakness/paresis (52.3%). As Per, Markwalder grade on admission, 33 (50.7%) patients were in grade 1, 30 (46.1%) patients were in grade 2. The clinical picture at discharge was evaluated according to the Markwalder grade: 52 patients (80%) were grade 0, 2 patients (3%) grade 1, 9 patients (13.8%) grade 2

Conclusion: Headache and limb weakness are the most predominant presenting symptoms. The outcome correlates with the patient's pre-operative neurological status, Glasgow Coma Scale and associated systemic diseases.

Keywords: chronic subdural haematoma; markwalder; glasgow coma scale

Introduction

Chronic subdural haematoma (CSDH) is an encapsulated collection of old blood between the dura mater and arachnoid caused by tear of bridging veins. Chronic subdural haematoma is considered when the blood is more than three weeks old. It is fairly common disease, especially in the elderly with incidence ranging 1.72 to 7.35 per 100,000 population with male predominance.1,2,3. Elderly population is associated co- morbidities that can impact on immediate postoperative outcome and overall survival. Although history of trivial trauma is present in majority of cases but some cases may be secondary to coagulation defect, intracranial hypotension, and use of anticoagulant and antiplatelet agents. It commonly presents with headaches, confusion, drowsiness, vomiting, and seizures. On examination, the patient has various neurological deficits, including a low Glasgow coma scale, hemiparesis/hemiplegia, ocular palsy, and other deficits. Diagnosis is usually confirmed by NCCT scan head however MRI are indicated for better visualisation of, multiloculated, intrahaematoma membranes. This condition is mostly treated with surgery, but some patients have also been managed conservatively with steroids. Steroids have been used in patients with minor headaches and patients who are unfit for surgery 4.

Materials And Methods

Study Population

The study population comprised of all > 18-year age group patients who were operated for chronic subdural hematoma in Neurosurgery Department of tertiary care center.

Study Design

The study design was prospective cohort study. Patients who met inclusion criteria, post-operative outcomes were assessed at discharge, then at one month and three months afterwards in the neurosurgery OPD.

Sample Size

Sample size (n) was obtained using following formulae for prevalence-

$$n = \frac{Z^2 * (p) * (1-p)}{m^2}$$

Where:

Where n = required sample size

p = estimated prevalence set at between 1.72 to 7.35/100,000 based on previous studies

m = Precision with which to measure prevalence of the study (margin of error) (confidence interval), set at ± 5%

The Z value is 1.96 for 95% confidence interval. Substituting in the above formula, the sample size ranged 26-104 and since the local incidence was unknown, we used the average sample size of (26+104)/2=65. All patients who fulfilled the criteria of the study were recruited until the number of sample size was achieved.

Inclusion Criteria

Patients of chronic subdural hematoma who were more than 18 years of age, as per radiological and clinical presentation and who had undergone surgery.

Methodology

It included a detailed history, clinical examination, and CT scan/MRI scans were done to confirm the diagnosis. Consent before enrolling patient in the study, written informed consent was obtained in / English/ Hindi/ from the patient, or from the blood relative preferably the first degree relative in patients who were comatose or were unable to give consent, explaining both the treatment options i.e., BHC and Mini craniotomy as required as per CT

scan or MRI findings. Ethical approval was taken from the Institutional Ethics Committee.

Detailed history including history of trauma within last 3 months or earlier, use of anticoagulants or antiplatelet drugs in last 1 week, alcoholism, history of hypertension and diabetes were obtained. Complete clinical examination and neurological examination including Glasgow coma scale (GCS) and Markwalder’s Grading Scale (MGS) of the patients was done.

Routine blood investigations and coagulation profiles were obtained. Any coagulopathy correction and need of blood or blood product transfusion were noted. CT details of the following parameters: maximum thickness of hematoma, density, midline shift and septation in the haematoma. MRI was done when there was doubt of septation on CT brain.

All patients underwent surgical evacuation under General Anaesthesia OR Monitored Anaesthesia Care (MAC).

All patients were followed in the outpatient department at 1 month and 3 months after discharge. Markwalder Neurological Grading System for CSDH was used for comparing preoperative, postoperatively, 1 month and 3 months.

A total of 65 patients were admitted to the Neurosurgery Department at the tertiary care centre. All patients underwent surgery for chronic subdural haematoma.

Results

Demographic Characteristics Out of 65 patients, the majority of them were in 8th decade, (71-80) (30.7%) followed by 7th decade (61-70) (23.0%) (Table-1, Figure- 1). There was male gender predominance with majority of the cases being men (87.6%), which translates to male to female ratio 9:1 (Table -2).

Age (years)	No of Patients (%)
31-40	2 (3.0%)
41-50	8 (12.3%)
51-60	10 (15.3%)
61-70	15 (23.0%)
71-80	20 (30.7%)
81-90	10 (15.3%)
Total	65 (100%)

Table 1: Age distribution

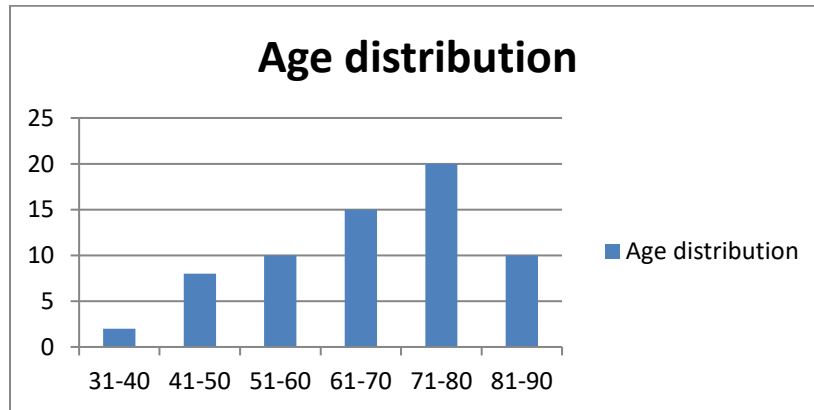


Figure 1: Bar chart showing age distribution.

Sex	No of Patients (%)
Male	57 (87.6%)
Female	8 (12.3%)
Total	65 (100%)

Table 2: Gender Distribution

Clinical Presentation

Out of 65 patients, majority of them presented with headache (61.5%), followed by extremity weakness/paresis (52.3%). Other presenting

symptoms were confusion (38.4%), nausea/vomiting (29.2%), speech disturbance (21.5%), convulsions (6.15%), blurring of vision (1.5%) respectively (Table-3, Figure- 2).

Presenting Complaints	No of Patients (%)
Headache	40 (61.5%)
Nausea/vomiting	19 (29.2%)
Monoparesis	4 (6.15%)
Hemiparesis	25 (38.4%)
Quadriparesis	5 (7.6%)
Speech disturbance	14 (21.5%)
Confusion	25 (38.4%)
Convulsions	4 (6.15%)
Loss of consciousness	10 (15.3%)
Blurring of vision	1 (1.5%)

Table 3: Presenting Complaints

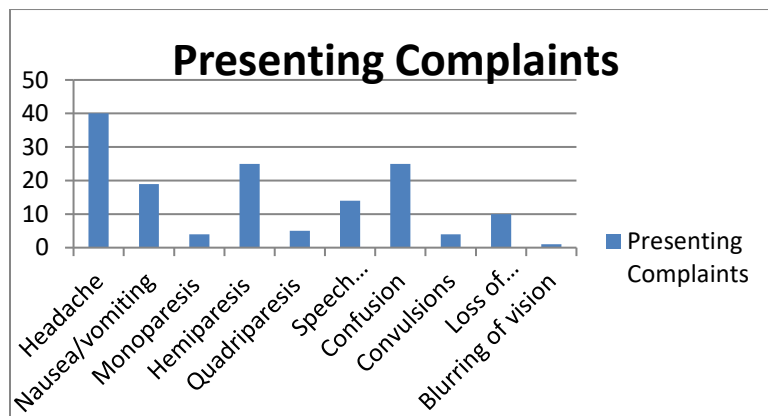


Figure 2: Bar chart showing incidence of symptoms

Risk Factors

Out of all the risk factors that were associated with CSDH, trauma was commonest with (38.4%) history of trivial trauma in recent past, followed by, use of anti-platelet agents (36.9 %) in which aspirin and clopidogrel

were mainly used, history of alcohol consumption (32.3%), anticoagulant use, mainly warfarin was found in (7.6%) range of INR from 2 to 5.5, history of CVA (7.6%), history of seizure disorder (4.6%), previous head surgery (4.6%), previous severe head injury (4.6%) and VP shunting (1.5%) respectively (Table- 4, Figure-3).

Risk factors	No of patients (%)
Trivial trauma	25 (38.4%)
Anti-platelet agent	24 (36.9%)
Alcohol use	21 (32.3%)
Anticoagulant use	5 (7.6%)
CVA	5 (7.6%)
Seizure disorder	3 (4.6%)
Previous head surgery	3 (4.6%)
Previous head injury	3 (4.6%)
VP shunting	1 (1.5%)

Table 4: Risk Factors

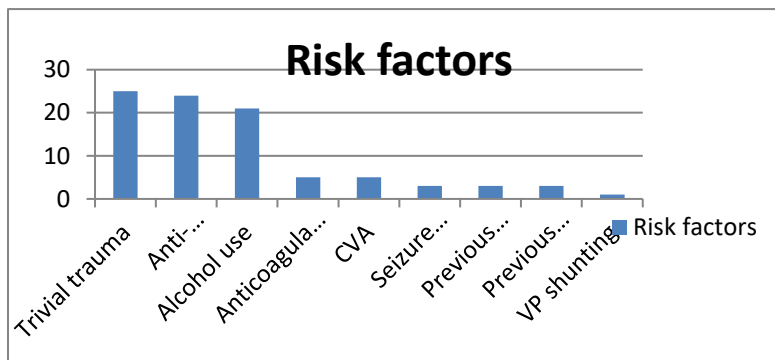


Figure 3: Bar chart risk factors for CSDH

Duration of trauma

Duration of trauma in chronic subdural haematoma varied from the 4-20 weeks, majority of patient had duration of trauma in between 4-12 weeks (Table- 5, Figure- 4).

Duration (in weeks)	No of patients (%)
4-8	10 (38.4%)
8-12	10 (38.4%)
12-16	5 (19.2%)
16-20	1 (0.38%)

Table 5: Duration of trauma in chronic subdural haematoma (n= 26)

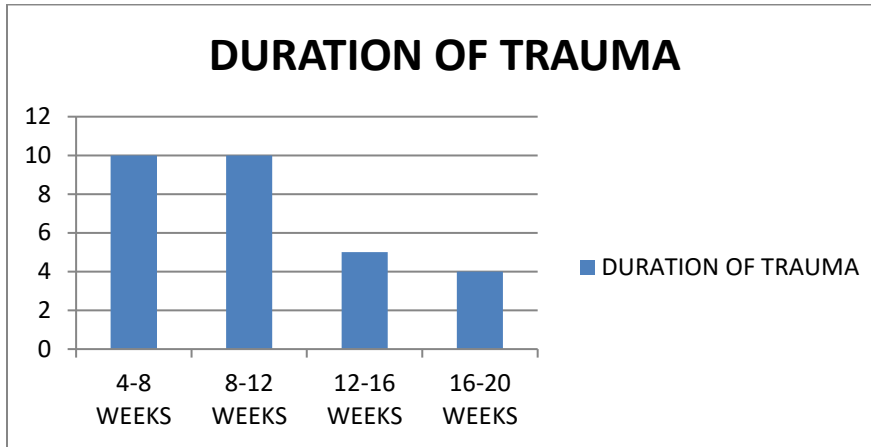


Figure 4: Bar chart duration of trauma in CSDH

Comorbidities

In terms of other underlying medical conditions, hypertension was highest at 46.1% followed by Diabetes was 38.4%, CAD was 12.3%, renal disease was

6.1%, Chronic obstructive pulmonary disease was 4.6% and lastly Liver disease was 1.5% (Table-6, Figure 5).

Co-morbidities	No of patients (%)
Hypertension	30 (46.1%)
Diabetes	25 (38.4%)
Renal disease	4 (6.1%)
COPD	3 (4.6%)
Liver disease	1 (1.5%)
CAD	8 (12.3%)

Table 6: Comorbidities

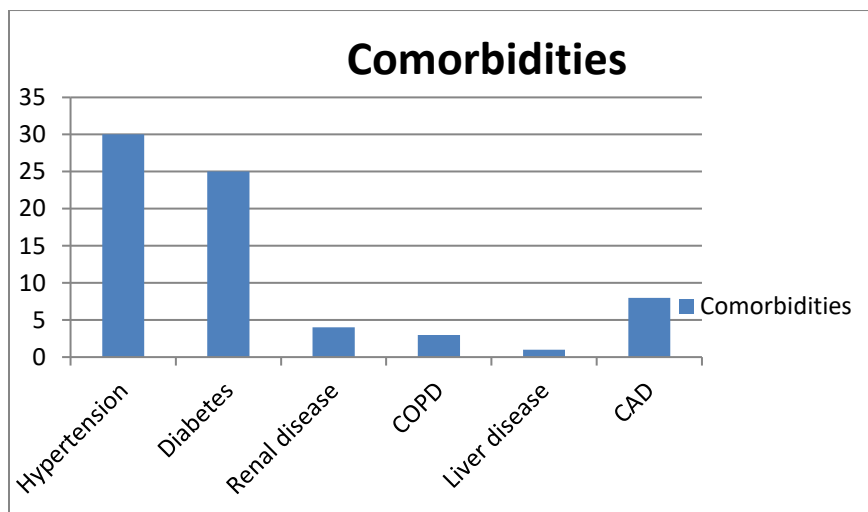


Figure 5: Bar chart showing co morbidities in CSDH

On admission neurological state

Majority of the patients 54 (83.0%) had Glasgow Coma Scale of 15/15, 9 patients were in altered sensorium and 2 patients were in coma. (Table- 7)

Glasgow Coma Scale Score	No. of patients (%)
9	2 (3.0%)
10	0
11	0
12	0
13	3 (4.6%)
14	6 (9.2%)
15	54 (83.0%)

Table 7: on admission GCS score

Markwalder grading on admission

As Per, Markwalder grade- no patient (0%) was grade 0, 33 (50.7%) patients were in grade 1, 30 (46.1%) patients were in grade 2, 1(1.5%) patient was in grade 3 and 1 (1.5%) patient was in grade 4 (Table- 8, Figure - 6).

Grade	Markwalder grading	No. of patients (%)
0	Neurologically normal	0
1	Alert & oriented, mild symptoms such as headache or mild neurological deficit such as reflex asymmetry.	33 (50.7%)
2	Drowsy or disoriented or variable neurological deficit such as hemiparesis.	30 (46.1%)
3	Stuporous responding appropriately to noxious stimuli, several focal signs such as hemiplegia.	1 (1.5%)
4	Comatose with absent motor response to painful stimuli, decerebrate or decorticate posturing.	1 (1.5%)

Table 8: Markwalder grading on admission

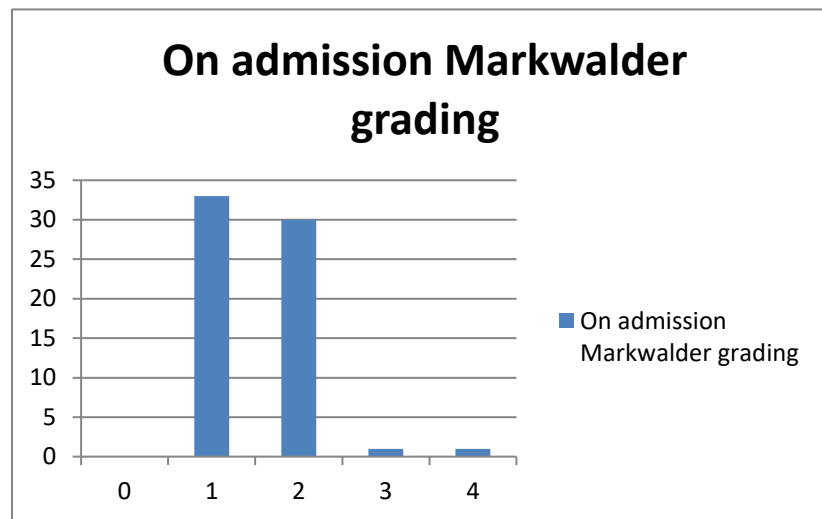


Figure 6: Bar diagram showing Markwalder grading on admission.

Markwalder grading on discharge

The clinical picture at discharge was evaluated according to the Mark walder grade: 52 patients (80%) were grade 0, 2 patients (3%) grade 1, 9 patients

(13.8%) grade 2, one patient (1.5%) grade 3 and no patient (0%) grade 4. (Table-9, Figure- 7)

Grade	Markwalder grade	No of Patients (%)
0	Neurologically normal	52 (80%)
1.	Alert & oriented, mild symptoms such as headache or mild neurological deficit such as reflex asymmetry.	2 (3.0%)
2.	Drowsy or disoriented or variable neurological deficit such as hemiparesis.	9 (13.8%)
3.	Stuporous responding appropriately to noxious stimuli; several focal signs such as hemiplegia.	1 (1.5%)
4.	Comatose with absent motor response to painful stimuli, decerebrate or decorticate posturing.	0 (0%)

Table 9: Markwalder grading on discharge

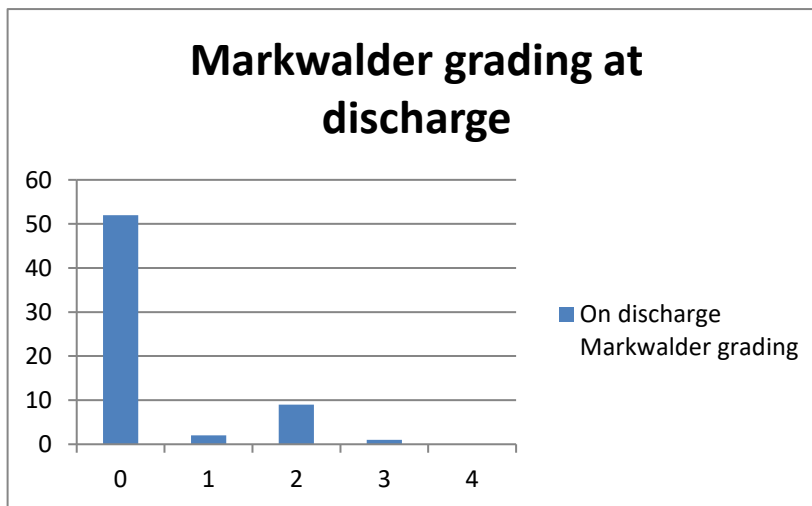


Figure 7: Bar diagram showing Markwalder grading at discharge

In assessment of pre operative neurological status, it was found that 54 (83.0%) of the patients, had Glasgow coma scale score of 15/15. 33 of our patients presented with the MGS 1 and 30 were MGS 2 at the time of admission and 1 patient was having MGS of 3 and 1 patient of MGS 4. On post operative outcome, we had 52 patients (80%) with favourable outcome of MGS 0 at discharge. Improvement up to MGS 0 in MGS progressed to 63(96.9%) patients at 3 months follow up. One patient expired and one had mild neurological deficit at 3 month follow up.

Discussion

Chronic subdural haematoma frequently encountered in the neurosurgical practice. It predominantly occurs in elderly people and so we will see a continuous increase in incidence due to aging of the population.2-4 The reason for its major occurrence in older people lies within the increasing brain atrophy and the correlated increased baseline stretch on the bridging veins which makes them more vulnerable to minor head trauma, which is one of the most frequently encountered causes for CSDH. 5,6,7 Due to the age of patients and their increasingly existent co-morbidities it is important to find a surgical method that provides optimal efficacy in reducing the potentially life-threatening hematoma-related mortality and morbidity and simultaneously shows a low rate of recurrence and surgery-related complications. But on the other hand, is as gentle and safe as far as possible for the often-comorbid patients. 8

In our study, the mean age of the study sample was 66.73 years, which corresponds to earlier published studies. 9,10,11,12,13 Male predominance

(87.6%) is seen in our study which is similar to previous publications. 9,11,14,15

In our study, out of 65 patient’s majority of the patients presented with headache (61.5%) followed by extremity weakness/paresis (52.3%), other presenting symptoms were confusion (38.4%), nausea/vomiting (29.2%), speech disturbance (21.5%), convulsions (6.15%), blurring of vision (1.5%) respectively. According to Santarius et al., 16 the most frequent presenting symptoms are gait abnormalities (57%), disturbed conscious level (35%), hemiparesis (35%), and headache (18%). In literature, the most common presentation in the elderly (50%–70%) was altered mental state.17,18 Hemiparesis was found in 58% of cases in one series.19 The incidence of headache varied in different studies ranging from 14% to 50%.20,21 Epilepsy is a rare presentation and is reported in up to 6% of cases as an initial symptom.19 Our study also conforms to the same. The incidence of CSDH presenting with transient neurologic deficits (TND) varies from 1% to 12%.22 We did not have TND features in our group of patients.

Trivial trauma which was most important risk factor (40%) was mostly minor and remote. The duration to onset of symptoms from trauma range was mean 7.9 weeks (4 to 20 weeks). The history of trauma could even be higher keeping in mind the recall bias as significant patients presented with confusion; trauma was remote and often minor especially in elderly. Minor head insult has been confirmed by different authors 23,24,25,26,27 to be a major predisposing factor. Strooband 28, in his study of 100 patients, found it be as high as 80%, compared to taking aspirin (16%), coagulopathy (6%) and alcoholism (11%). In our study, also trauma is the highest at 40%

followed by antiplatelet agents (35.3%) and alcohol consumption (32%). Although incidence of anticoagulant was 7.6% and antiplatelet agent use was 35.3% in our study. Chronic alcoholic abuse causes coagulation dysfunction due to the hepatic harm.²⁹ Other factors that have an increased risk of developing a CSDH, are kidney disease, haemodialysis, liver dysfunction, epilepsy and chemotherapeutics agents, as described by Sim et al. ²⁹.

INR was deranged in 5 patients which was corrected before surgery but 1 patient (1.5%) had persistent coagulopathy, and he had recurrence post operatively. Though some series have reported high incidence of coagulopathy, which ranged from 10% to as high as 42% ^{30,31}. In a

multivariate analysis of risk factors in intracranial haemorrhage carried out by Berwerets and Webster ³² oral anticoagulation, hypertension, INR >4.5 and duration of anticoagulation were found to be significant predisposing factors.

Neurological picture, upon arrival as well as at discharge, was evaluated with the Markwalder grading. Comparative analysis of our study with the series of Ernestus et al ³³, Kotwica et al ³⁴, Drapkin et al ³⁵ and Richter et al ³⁶, who also adopted the same method of evaluation our study matches with results of Drapkin et al ³⁵. (Figure -8, 9)

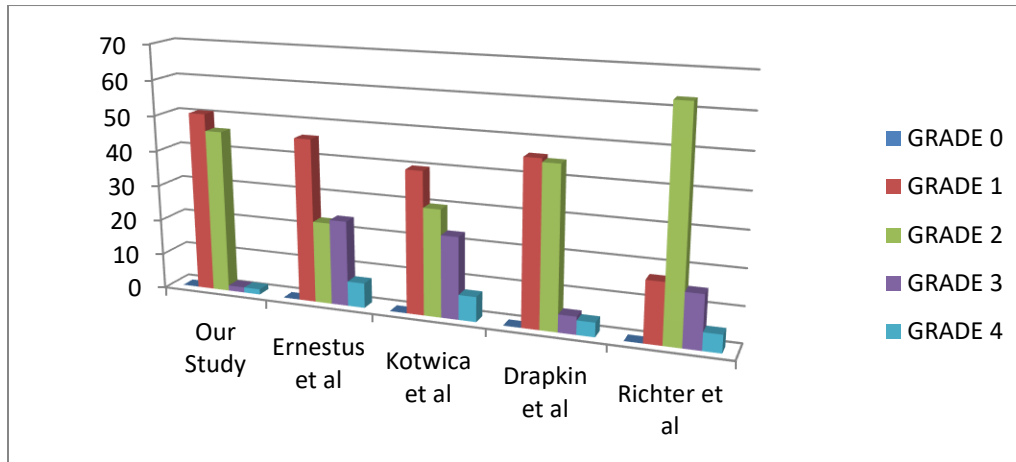


Figure 8: Markwalder grading on admission comparison of present series with other series

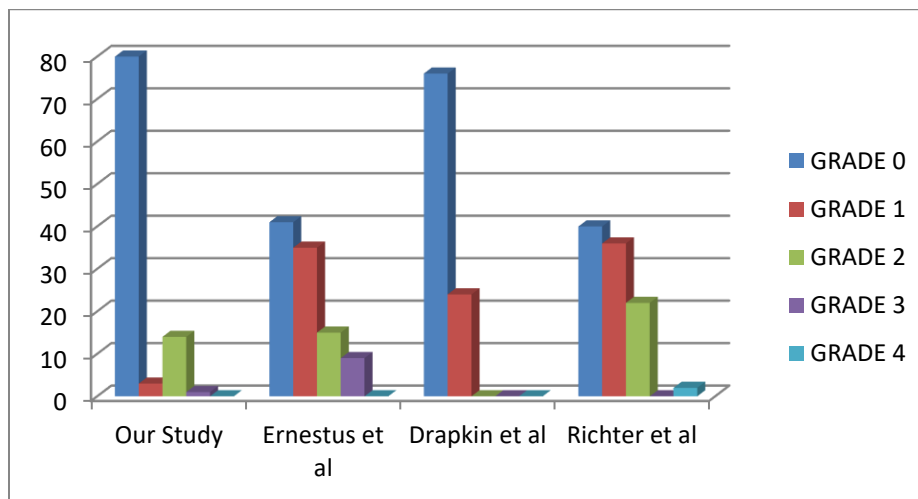


Figure 9: Markwalder grading at discharge comparison of present series with other series

Conclusion

- Headache and limb weakness are the most predominant presenting symptoms.
- Possible predisposing factors include diabetes mellitus, hypertension, antiplatelet agent, and anticoagulant.
- The outcome correlates with patient’s pre-operative neurological status, Glasgow Coma Scale and associated systemic diseases.

Conflicts of Interest-No

Funding and support – No

Ethical consideration- approval was taken from institutional ethical committee

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