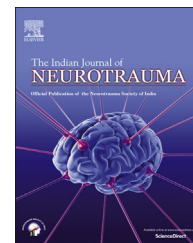


Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect

journal homepage: [www.elsevier.com/locate/ijnt](http://www.elsevier.com/locate/ijnt)

## Original Article

# Subacute and chronic subdural hematoma in young population less than 40 years



Pragyan Sarma<sup>a</sup>, B. Indira Devi<sup>b,\*</sup>, Dhaval P. Shukla<sup>c</sup>,  
Dhananjaya I. Bhat<sup>c</sup>

<sup>a</sup> Senior Resident, Department of Neurosurgery, NIMHANS, Bangalore, Karnataka, India

<sup>b</sup> Professor and Head, Department of Neurosurgery, NIMHANS, Bangalore, Karnataka, India

<sup>c</sup> Additional Professor, Department of Neurosurgery, NIMHANS, Bangalore, Karnataka, India

## ARTICLE INFO

## Article history:

Received 17 February 2014

Accepted 1 May 2014

Available online 28 May 2014

## Keywords:

Chronic subdural hematoma

Young adult

Recurrence

## ABSTRACT

**Objective:** The objective of this study was to analyze clinical, radiological and surgical results of subacute and chronic subdural hematomas (CSDH) in young patients less than 40 years.

**Methods:** This is a retrospective study of young patients who were surgically treated for subacute and chronic SDH during a 10-year period from 2002 to 2012. A total of 1642 patients were treated for these conditions, of which 136 patients (0.083%) were of 40 years or less. Complete clinical, surgical, and radiological records were available for 92 (15 female and 77 male) patients.

**Results:** 79 (86%) cases had history of prior trauma. However few cases had association with toxoplasmosis, renal failure, hypothyroidism and VP shunt. Young patients mainly presented with symptoms of raised intracranial pressure and around 19% had history of alcohol abuse. 13 cases had altered blood parameters. Overall results of surgery were good. Post-operative recurrence was seen in only 13 cases.

**Conclusion:** Young adults with CSDH show less severe clinical and radiologic features as well as fewer recurrences than noted in the elderly population. In young adults with unexplained headaches, there should be low threshold for computed tomographic scan of brain. Burr hole evacuation is satisfactory and histological examination is mandatory particularly in cases where there is no history of trauma.

Copyright © 2014, Neurotrauma Society of India. All rights reserved.

## 1. Introduction

Chronic subdural hematoma (CSDH) is a common entity in neurosurgical practice and is mostly seen in elderly

population. In majority of the cases it has a self-limited course. However incidence of CSDH has been increasing in younger patients as a result of several clinical trends that increase bleeding risk including increased use of anticoagulant therapy and hemodialysis and longer survival with systemic

\* Corresponding author. Tel.: +91 9480829601.

E-mail addresses: [bidevidr@gmail.com](mailto:bidevidr@gmail.com), [drindiradb@gmail.com](mailto:drindiradb@gmail.com) (B. Indira Devi).

<http://dx.doi.org/10.1016/j.ijnt.2014.05.001>

0973-0508/Copyright © 2014, Neurotrauma Society of India. All rights reserved.

hematologic disease. Despite the benign nature of CSDH, re-accumulation of hematoma is still a matter of concern, and disease progression can be fatal without timely surgical intervention.

CSDH is more likely to be missed in young adults because lower incidence in this patient population and low degree of clinical suspicion. Clinicians infrequently recommend imaging studies in patients younger than 40. Clinical presentation and radiologic findings of CSDH differ among patients in different age group. Until recently, most CSDH research has focused on treatment, frequency of recurrence and pathophysiology.

Several studies reported the difference of clinical presentation and result of CSDH according to age. In this study, we aimed to identify characteristics of CSDH in young adults in terms of presenting symptoms, radiological findings, associated conditions and histopathology reports.

## 2. Materials and methods

This is a retrospective study of young patients aged less than 40 years who were surgically treated for CSDH during a 10-year period from 2002 to 2012. A total of 1642 patients were treated for CSDH, of which 136 (0.083%) patients were 40 years or less. The complete clinical, surgical, and radiological records were available for 92 (15 female and 77 male) patients. Medical records and radiographic findings were reviewed retrospectively. A proforma was made and demographic factors, onset of predominant presenting symptom, history of head trauma and underlying disease data were recorded. All patients underwent preoperative computed tomography (CT) with or without contrast enhancement. 8 of these patients underwent MRI prior to diagnosis. Maximum thickness of subdural hematoma and midline shift were measured. CSDH was classified into the following subtypes: 1) Subacute 2) Chronic. Cases presenting with symptoms after 3 weeks of trauma along with hypodense collection in the subdural space were considered as chronic SDH and those presenting after 1–3 weeks with isodense collection were considered as subacute. Those with no history of trauma only radiological findings were taken into consideration to categorize.

Surgical procedures were performed under general anesthesia, but patients with poor medical condition often underwent surgery with local anesthesia and light sedation. Drain was placed in some of the cases. Histopathology reports were available for 37 cases.

## 3. Results

Out of the 92 cases studied in details the mean age at diagnosis was 29.21 years. History of trauma was present in 79 cases (86%) cases. The mean interval from trauma to diagnosis was 33 days. The main symptoms were headache 83 cases (90%), vomiting 71 cases (77%), paresis 18 cases (20%), and altered sensorium in 23 cases (25%). The mean thickness of SDH was 11 mm. The mean midline shift was 10 mm. Hematological profile revealed anemia in 4 patients, thrombocytopenia in 5 patients, and altered coagulation profile in 4 patients. The

associated conditions were alcoholism in 18 cases (19%), VP shunt in 3, arachnoid cyst in 1, toxoplasmosis in 1, renal failure in 1, hypothyroidism in 1 and empyema in 1 patients. The SDH was right-sided in 75% cases, left-sided in 22%, and bilateral in 3% (Figs. 1 and 2).

Various surgical procedures were performed (Table 1).

Post-operative recurrence occurred in 13 cases. Most of them were managed with repeat burr holes and in 2 cases where second episode of recurrence occurred, craniotomy was performed. There was no mortality in this study.

Histopathology (HP) investigation was sent in  $n = 32$  cases (35%), The HP findings were membrane in 40% and clot in 45% and others consisted rest of the cases. The mean duration of follow up was 36 months (Fig. 3).

## 4. Discussion

Chronic Subdural haematoma in patients between 20 and 40 years of age should be considered a rare occurrence. When comparing young versus elderly patients with CSDH, we assume that the same etiopathogenetic factors known to occur in older patients are involved (slight subdural bleeding associated with osmotic or hemostatic alterations). In younger population the reduced brain-duramater interface, which partially prevents brain motion under fast acceleration-deceleration trauma momentum and cortico-dural vein disruption, decreases the likelihood of subdural blood collections. In our series, patients presented mainly with symptoms of raised intracranial pressure. Paresis and altered sensorium were less common and were seen mainly when midline shift exceeded 1.1 cm. Lower rate of recurrence, shorter symptom duration and fewer leading signs such as hemispheric symptoms seen in our study coincides with other similar studies.<sup>1</sup>

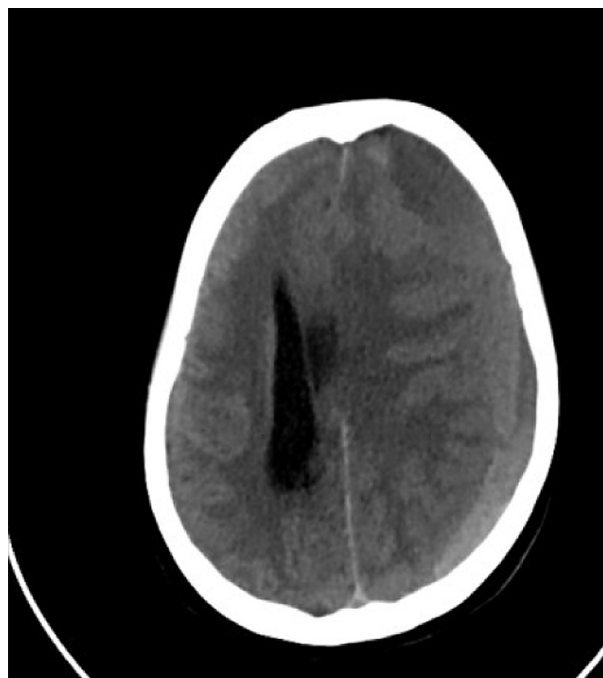


Fig. 1 – CT (plain) image of a case of CSDH.



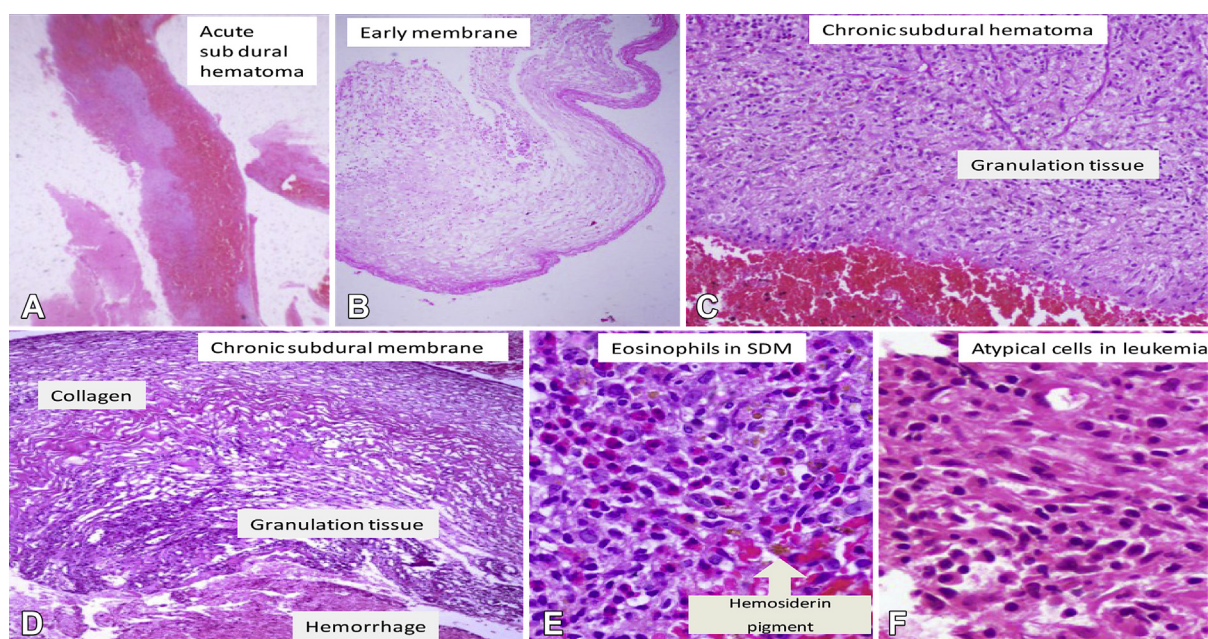
**Fig. 2 – CT (contrast) image of the same patient.**

The male prevalence in our series (77 male and 15 female patients) also coincides with findings of other major series.<sup>2-7</sup> This male predominance leads us to assume that the etiopathogenic factors responsible for the formation of

chronic SDH are the same in under and over 40 age groups. Trauma is undoubtedly the main etiology with an 86% incidence in our series and the literature also reports the same.<sup>6-9</sup> Current trends including liberal use of anti-platelets and anticoagulants, as well as longer life span due to well-controlled medical diseases such as liver cirrhosis, hematologic malignancy and alcoholism yield higher prevalence of CSDH, especially in young patients.<sup>1</sup> Recent research confirms that younger CSDH patients demonstrate greater prevalence of alcoholism and bleeding tendency than those older than 75 years.<sup>10,11</sup> According to Fogelholm et al<sup>12</sup> Older CSDH patients tend to show more hemiparesis and mental deterioration, whereas younger patients are more likely to complain of headache and demonstrate papilledema on physical examination. Elderly patients can endure a larger volume of hematoma collecting in the subdural space before experiencing clinical manifestation. Spallone et al<sup>13</sup> described that etiologic trauma was consequently not as severe in elderly patients. Notably, insignificant prior trauma and declining capacity for memory retrieval seem to result in indefinite involvement of head injury in the elderly. On CT scan the elderly patients, decreased volume of the brain secondary to cerebral atrophy allows the hematoma to reach a much greater size in comparison to younger counterparts. Hence young people with CSDH are detected early and so there should be a low threshold for investigating such cases with CT. Since the brain is essentially normal in volume in these patients even small volumes of blood lead to headache. For this reason MRI, whose

**Table 1 – Details of the surgical procedures performed.**

Procedure	Twist drill	Twist drill with drainage	Single burr hole	Double burr holes	Double Burr holes following twist drill	Craniotomy
No. of cases	18 (20%)	5 (4.9%)	9 (10%)	48 (52%)	10 (11%)	2 (2%)



**Fig. 3 – Photos of HPE reports.**



higher potential for resolution in this pathology is well documented<sup>14–17</sup> should be advantageous in young patients with thinner subdural blood layers, otherwise not detectable on CT scan especially during the isodense phase.<sup>14–17</sup> However MRI as the investigation of choice as well as its cost effectiveness in developing world for chronic SDH needs further evaluation. The author recommends long term prospective studies to determine the same. Removal of the CSDH provides immediate relief of symptoms. In our experience the burr hole does not cause any complications. Rapid brain re-expansion, which often does not allow irrigation of the subdural space and positioning of post-operative drainage is characteristic of the younger patients. There was no mortality in our series. Patients with altered blood parameters consisting 13 cases also underwent surgery after correction of INR following transfusion of FFP. In 6 of them emergency twist drill was done to relieve the mass effect due to poor sensorium. Histopathology revealed membrane and clots in most cases.

## 5. Conclusion

The clinical characteristics of Chronic SDH in young population less than 40 years comprised mainly of raised ICP features and severity is related to the midline shift. Since MRI is superior to CT for defining of CSDH, young patients with persistent headache after a head injury should undergo MRI to detect thin layers of CSDH. On the whole, in young patients prognosis is good, taking into account preoperative clinical status and the severity of the disease responsible for SDH formation. A high degree of clinical suspicion with prompt surgical intervention is the keys to effective management.

## Conflicts of interest

All authors have none to declare.

## Acknowledgment

Yasha TC, Professor and Head of the department of neuro-pathology in NIMHANS, Bangalore, Karnataka, India.

## REFERENCES

1. Deok Won Yu, Hyeong-Joong Y, Le Young Jun, Chun Hyoung-Joon, Cho Hyun, Bak Koang-Hum. Chronic subdural hematoma in young adult: an age comparison study. *Korean J Neurotrauma*. 2013;9:6–11.
2. Robinson RG. Chronic subdural hematoma: surgical management in 133 patients. *J Neurosurg*. 1984;61:263–268.
3. Sambasivan M. An overview of chronic subdural hematoma: experience with 2300 cases. *SurgNeurol*. 1997;47:418–422.
4. Aoki N. Subdural tapping and irrigation for the treatment of chronic subdural hematoma in adults. *Neurosurgery*. 1984;14:545–548.
5. Camel M, Grubb Jr RL. Treatment of chronic subdural hematoma by twist-drill craniotomy with continuous catheter drainage. *J Neurosurg*. 1986;65:183–187.
6. Fogelholm R, Heiskanen O, Waltimo O. Chronic subdural hematoma in adults. Influence of patient's age on symptoms, signs, and thickness of hematoma. *J Neurosurg*. 1975;42:43–46.
7. Grisoli F, Graziani N, Peragut JC, et al. Perioperative lumbar injection of ringer's lactate solution in chronic subdural hematomas: a series of 100cases. *Neurosurgery*. 1988;23:616–621.
8. Kotwica Z, Brzezinski J. Chronic subdural haematoma treated by burr holes and closed system drainage: personal experience in 131. *Br J Neurosurg*. 1991;5:461–465.
9. Richter HP, Klein HJ, Schäfer M. Chronic subdural haematomas treated by enlarged burr-hole craniotomy and closed system drainage. Retrospective study of 120 patients. *Acta Neurochir*. 1984;71:179–188.
10. Ernestus RI, Beldzinski P, Lanfermann H, Klug N. Chronic subdural hematoma: surgical treatment and outcome in 104 patients. *Surg Neurol*. 1997;48:220–225.
11. Liliang PC, Tsai YD, Liang CL, Lee TC, Chen HJ. Chronic subdural haematoma in young and extremely aged adults: a comparative study of two age groups. *Injury*. 2002;33:345–348.
12. Fogelholm R, Heiskanen O, Waltimo O. Chronic subdural hematoma in adults. Influence of patient's age on symptoms, signs, and thickness of hematoma. *J Neurosurg*. 1975;42:43–46.
13. Spallone A, Giuffrè R, Gagliardi FM, Vagnozzi R. Chronic subdural hematoma in extremely aged patients. *Eur Neurol*. 1989;29:18–22.
14. Hosoda K, Tamaki N, Masumura M, Matsumoto S, Maeda F. Magnetic resonance images of chronic subdural hematomas. *JNeurosurg*. 1987;67:677–683.
15. Moon KL, Brant-Zawadzki M, Pitts LH, Mills CM. Nuclear magnetic resonance imaging of CT-isodense subdural hematomas. *Am J Neuroradiol*. 1984;5:319–322.
16. Saleh J, Afshar F. Diagnosis of chronic subdural haematoma: the advantages of MR imaging compared with the CT-scan. *Br J Neurosurg*. 1987;1:369–374.
17. Sipponen JT, Sepponen RE, Sivula A. Chronic subdural hematoma: demonstration by magnetic resonance. *Radiology*. 1984;150:79–85.