

Original Article

Chronic subdural hematoma: A survey of neurosurgeons' practices in Nigeria

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Abstract

Background: Chronic subdural hematoma (CSDH) is a commonly encountered condition in neurosurgical practice. In Nigeria, a developing country, patients with CSDH are less likely to be diagnosed and treated by surgical drainage early. Aware of the reported variations in neurosurgeons' practices regarding CSDH in many parts of the world, we sought to determine the current practices of Nigerian neurosurgeons in managing CSDH.

Methods: An Internet-based survey was carried out in which all Nigerian neurosurgeons listed in the Nigerian Academy of Neurological Surgeons directory during the July–December 2012 time period were asked to participate. Questions asked in the survey were: (1) Type of treatment used in patients with CSDH, (2) Use of drains postoperatively, (3) Postoperative patient positioning, (4) Postoperative mobilization, (5) Postoperative complications, and (6) Postoperative computed tomography (CT) scan monitoring.

Results: Survey information was sent to the 25 practicing neurosurgeons in Nigeria who met the criteria listed above for being included in this study. Each of the 14 neurosurgeons who responded reported that CSDH is often misdiagnosed initially, usually as a stroke having occurred. Once a diagnosis of CSDH was made, the most common method of treatment reported was placement of one or two burr-holes for drainage of the hematoma. Reported, but used in only a few cases, were twist drill craniostomy, craniectomy, and craniotomy. Each neurosurgeon who responded reported irrigation of the subdural space with sterile saline, and in some cases an antibiotic had been added to the irrigation solution. Six of the 14 neurosurgeons left drains in the subdural space for 24–72 hours. Seven neurosurgeons reported positioning patients with their heads elevated 30° during the immediate postoperative period. No neurosurgeon responding reported use of steroids, and only one acknowledged routine use of anticonvulsive medication for patients with CSDH. Only 3 of the 14 neurosurgeons taking part in the study said they routinely order CT scans postoperatively.

Conclusion: There are several differences in the ways Nigerian neurosurgeons manage CSDH. Future studies may help to streamline the approaches to managing CSDH.

Key Words: Burr-hole drainage, chronic subdural hematoma, hematoma recurrence, Nigerian neurosurgeons, survey of practices

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INTRODUCTION

Although it has been recognized by neurosurgeons for about 16 decades since it was first described by Virchow,^[25] chronic subdural hematoma (CSDH) management is yet to be harmonized as has been done for many other neurosurgical conditions.^[19,27] There are several controversies regarding its etiologies, course, optimal care, and outcome.^[19,27] Issues regarding the optimal treatment options (twist drill craniostomy, burr-hole craniostomy, and craniotomy), use of drains, postoperative positioning of patients and timing of postoperative mobilization are not yet resolved.^[1,8,10,12,13,19,27] Regional, institutional, and personal differences exist and persist.^[4,19,21] In the author's opinion, these variations may be a reflection of the personal experiences, place of training and mentoring of the individual attending neurosurgeon.

At the November 2010 meeting of the Nigerian Academy of Neurological Surgeons (NANS) discussions of CSDH suggested wide variations in the management of the condition among the Nigerian Neurosurgeons in attendance in line with reported variations in neurosurgeons' practices in other regions of the world.^[4,21] This study therefore sought to determine the current practices of Nigerian neurosurgeons in the management of CSDH.

MATERIALS AND METHODS

Survey development

An internet-based survey of Nigerian neurosurgeons was conducted between July and December 2012 using a Google document survey questionnaire, which may be accessed at <https://docs.google.com/spreadsheets/viewform?fromEmail=true&formkey=dDF3T0ZDMUdMS081UTILRUpwd3FkaWc6MQ>. Background information on the participants regarding number of years in practice and practice setting were requested. Questions on clinical practices were set out in simple "yes or no" or multiple choice patterns as necessary. Respondents were surveyed on their case load of CSDH on per surgeon, per year basis and the clinical course and presentation of the CSDH patients. Their preferred methods of CSDH treatment (twist drill craniostomy vs. burr-hole craniostomy vs. craniectomy vs. flap craniotomy) were also assessed. Those who preferred burr-hole drainage were requested to indicate whether they make one or two burr-holes. Their adjuvant management strategy with respect to the irrigation of the subdural cavity and use of postoperative subdural drains, steroids, and anticonvulsants were then assessed. Those who use drains were further asked to indicate the duration of drain use.

Questions on postoperative care of the CSDH patients were designed to address the following: (1) Positioning of patients in the immediate postoperative period (height of

bed: Flat vs. 30° head-up vs. trendelenburg), (2) Timing of postoperative mobilization of the patients, and (3) Whether or not the surgeons obtained routine postdrainage computed tomography (CT). The next set of questions assessed recurrence rate of hematomas and the occurrence of other complications as experienced by the surgeons.

Survey administration

Participants were identified through the NANS directory used for the November 2010 and February 2012 meetings of the association, which is a complete listing of all neurosurgeons in Nigeria. Neurosurgeons who are retired or who are less than 1 year postcertification were excluded. E-mails soliciting for participation in the study were sent to all the 25 eligible neurosurgeons and contained a link to the online survey. Internet-based health care surveys have been validated by previous studies.^[3,6] This formed the decision to use the medium for this study.

An introductory cover letter in the e-mails as well as in the online questionnaire noted the apparent differences in care of CSDH in Nigeria and the need to objectively document the current practices. It also indicated the estimated time-burden for completing the questionnaire of 10 minutes and assured that participation was entirely voluntary and guaranteed confidentiality in the data collection and dissemination of results.

An initial study was conducted from February to July 2011. Only eight responses (representing about one-third of the survey population) were received. A preliminary presentation of the findings was made at the 2012 meeting of NANS in Enugu, Nigeria and members were called upon to participate in the survey to validate the findings. Consequently, a second survey (being reported here) was carried out from July to December 2012. The new survey included questions on the case load of CSDH, symptomatology and diagnosis of CSDH, use of steroids and anticonvulsants, as well as the diagnosis of recurrence. Reminders were sent on two occasions during the study period and telephone contacts also made with the neurosurgeons urging for participation in the study. Some respondents (when contacted by phone) had stated that poor access to the internet and their busy schedules delayed their participation.

Data analysis

The responses were recorded anonymously. Responses were recorded on the Google-based Microsoft-Excel database. Simple descriptive statistics of proportions was done using SPSS Version 15 (SPSS Inc., Chicago, IL). Differences in response rates were evaluated using Chi-square statistics (Epi info version 6). A $P < 0.05$ was considered statistically significant.

RESULTS

The respondents and patient population

The response rate was 56% (14 of 25). Most of the respondents were within 10 years of certification (9/14) and worked in government-owned hospitals (12/14) [Table 1]. The average case load of CSDH per surgeon per year is 18 (range: 10-30). Most cases of CSDH present late (>72 hours from symptom onset) especially due to delay in making initial diagnosis. However, the patients often present with favorable Glasgow Coma Score (GCS) of 13-15. All respondents reported that CSDH is often initially misdiagnosed as stroke.

Drainage method

The respondents use single burr-hole (7, 50.0%) or double burr-holes (7, 50.0%) as the primary treatment option. Secondary options were twist drill craniostomy, craniectomy, and craniotomy for CSDH management as reported by 4/14, 1/14, and 3/14 of them, respectively [Table 2].

Adjuvant surgical strategy

All respondents routinely irrigate the subdural space until clean returns are obtained. Saline impregnated with antibiotics is used by 11 while 3 use saline only. Six of the respondents place subdural drains using nasogastric tubes, Foleys catheters, or scalp vein needles [Table 2]. The drain is made to exit the scalp via a separate stab incision by three respondents while the other three pass the drain through the same incision for drainage of the hematoma. They remove the drain when the effluent is minimal and/or CSF-like.

Postoperative patient care

Most of the respondents (7/14) nurse their patients 30° head-up in the immediate postoperative period. Reported timing of postoperative mobilization of patients varied from within 24 hours to postoperative day 8-10. Most of the respondents do not obtain routine postoperative CT scans due to financial constraints (5/14) and because they do not think it is generally useful (6/14). Only three surgeons do routine postoperative CT and they reported that it influenced the postoperative care of their patients [Table 3]. One of them reported diagnosis of pneumocephalus as well as fresh bleeding into the subdural space, while one surgeon stated that it was mostly for reassurance though it led to reoperation in some cases. The third surgeon reported that two patients required reinsertion of the subdural drain when significant residual blood was seen on the postoperative CT.

None of the respondents routinely use steroids in managing CSDH while only one routinely uses anticonvulsants.

Complications

The surgeons assessed the success of the hematoma evacuation using clinical improvement/decline. CT is combined as necessary. The reported approximate

Table1: Background of respondents and profile of CSDH

	No of Respondents
No of years in practice	
<5	6
6-10	3
11-15	3
16-20	1
>20	1
Practice Setting	
Government-owned hospital	12
Private hospital	2
Approximate case load of CSDH per year per surgeon	
10	7
20	3
30	4
Average duration of event e.g trauma to symptom onset (weeks)	
1-3	1
4-6	9
>6	4
Interval between symptom onset and presentation at neurosurgical facility	
Early (within 72hrs)	2
Late (>72hrs)	12
Causes of late presentation	
Delay in seeking care	2
Delay in making initial diagnosis though early presentation at a health facility	11
Delay in referral even when diagnosis has been made	1
Misdiagnosis of CSDH as stroke before neurosurgical review	
Often	12
Very often	2
Rare	0
Very rare	0
Most common range of GCS at presentation	
3-8	0
9-12	5
13-15	9

hematoma recurrence rates were 0% (5/14), 1-5% (8/14), and 6-10% (1/14). Recurrence was reported by only 3 of those who do not use drains (8) as opposed to 6/6 of those who use drain ($P = 0.0309$). In addition, recurrence was reported more by those who nurse patients in trendelenburg position (4/14) as opposed to those who nurse them 30° head up and flat (4/7 and 1/3, respectively) in the immediate postoperative period. These differences were not statistically significant ($P = 0.1628$). Recurrence was also reported more by those who mobilize their patients within 24 hours (4/4) than by 48 hours (3/7) and after 48 hours (1/3) ($P = 0.1453$). Other reported complications of

Table 2: Primary and adjuvant surgical methods

	No of Respondents
Primary method of evacuating uncomplicated straightforward CSDH	
Twist-drill craniostomy	0
Burr-hole craniostomy	14
Craniectomy	0
Flap craniotomy	0
Secondary methods employed in managing CSDH	
Twist-drill craniostomy	4
Craniectomy	1
Flap craniotomy	3
Number of burr hole made on a side	
1	7
2	7
Subdural space irrigation	
Yes	14
No	0
Substances used for irrigation	
Saline only	3
Saline + antibiotics	11
Timing of subdural irrigation	
Intra-op only	14
Post-op only	0
Intra-op + Post-op	0
Placement of subdural drain	
Yes	6
No	8
Types of drain employed	
Nasogastric tubes size 8	2
Nasogastric tubes size 10	2
Foleys catheter sizes 10 – 14	1
Improvised scalp vein needle	1
Duration of drain use (Hrs)	
24	2
48	3
72	1

clinical significance were deep venous thrombosis (1/14), pneumonia (1/14), and wound infection (2/14) [Table 3].

DISCUSSION

The management strategies available for CSDH may be as varied as the number of attending neurosurgeons in any particular institution. These variations probably underscore the fact that much is yet unknown about this common condition. Variations in practices among neurosurgeons in different countries regarding CSDH management have been documented.^[4,21] These studies showed differences in the surgical option of choice, use of steroids, drains, positioning, and mobilization.

Table 3: Post-operative practices and complications

	No of Respondents	Pooled Recurrence rate*
Post-op positioning of patients		
Trendelenburg	4	5.0%
Flat	7	1.6%
30° head-up	3	3.6%
Timing of post-op mobilization		
24 hours	4	6.3%
48 hours	7	2.1%
POD 4-7	2	5.0%
POD 8 – 10	1	0.0%
Routine post-op CT		
Yes	3	
No	11	
Approximate Recurrence Rates		
0%	5	
1-5%	8	
6 – 10%	1	
> 10%	0	
Other complications of clinical significance		
Pneumonia	1	
Deep venous thrombosis/ Pulmonary embolism	1	
Wound infection	2	
None	10	
Routine use of steroids		
Yes	0	
No	14	
Routine use of anticonvulsants		
Yes	1	
No	13	

*Pooled Recurrence rate = sum of the highest reported recurrence rate by each surgeon in a group + no of surgeons in the group

The landmark review by Markwalder^[15] provided the initial overview of the management of CSDH. Prior to that period, craniotomy with membranectomy used to be considered necessary in all cases.^[7,17] Later, membranectomy or capsulectomy was deemed to be of less importance than the drainage of the hematoma itself.^[18] Moreover, simple burr-hole drainage was found to be more effective than membranectomy.^[22] Markwalder had concluded that “In treating chronic SDH, the twist-drill craniostomy and closed-system drainage of the subdural collection seem to be today’s most rational approach to this lesion in children beyond the infant period and in adults. Craniotomy, membranectomy, and craniectomy should be reserved for those instances in which the subdural collection reaccumulates, the brain fails to expand, or there is solid hematoma.”^[15] Despite these conclusions and given the absence of randomized trials to compare the various methods of draining the

hematoma, these various methods have been reported thereafter with varying success rates.^[5,23,24,26]

In an evidenced-based review of contemporary surgery for CSDH, Weigel and colleagues did not find any study that provided class I evidence on the efficacy of the various management practices.^[27] However, the authors “identified twist drill craniostomy and burr-hole craniostomy as the safest methods” and noted that “burr-hole craniostomy has the best cure to complication ratio and is superior to twist drill craniostomy in the treatment of recurrences” and that “craniotomy and burr-hole craniostomy have the lowest recurrence rates”.^[27]

Regarding postoperative positioning of the patients, the various techniques adopted also reveal how so much more needed to be known about CSDH. Tredenlenburg positioning has been practiced with the hope of increasing CSF pressure and aiding brain reexpansion.^[22] Head-up positioning in the immediate postoperative period have been reported with conflicting results. While Abouzari and his colleagues^[1] reported that assuming the head-up position significantly increased the recurrence of CSDH, Ishfaq *et al.*^[12] reported that it does not.

To drain or not to drain used to, and is probably still, an important discourse in CSDH management. Subdural drain when combined with twist drill craniostomy was considered useful as it allows slow, steady and more complete evacuation of the hematoma and gradual reexpansion of the brain.^[23] Subperiosteal drain has also been employed and is thought to reduce the rate of seizure occurrence as well as intracranial infection.^[28] Still, many neurosurgeons fear to use drains because of the potential risks of infections associated with it.^[4] To further highlight these variations, Henning and Kloster^[9] found that continuous irrigation of the subdural space with inflow and outflow after burr-hole decompression of CSDH have a low recurrence rate (2.6%) compared with burr-hole craniostomy with intraoperative irrigation and postoperative closed system drainage, burr-hole craniostomy with intraoperative irrigation only, and craniotomy (29.4%, 39.5%, and 44.4%, respectively).^[9]

Although, the practices of the nonrespondents may be substantial in the overall overview of CSDH management in Nigeria, the findings of this study indicate that:

- Nigerian neurosurgeons use burr-hole as their preferred method of surgical treatment of CSDH
- Subdural space irrigation is generally practiced in Nigeria
- There is no consensus regarding postoperative positioning of patients among Nigerian Neurosurgeons
- Routine postoperative CT scanning is not a common practice in Nigeria due to financial constraints
- Nigerian neurosurgeons do not routinely use steroids in managing CSDH

- A large majority of Nigerian neurosurgeons do not use prophylactic anticonvulsants in the management of patients with CSDH.

An equal number of respondents (7 each) use single and double burr-holes in managing CSDH. This lack of uniformity is supported by a recent literature from Nigeria.^[11] Although, there are no Class I evidence supporting its superiority over other principal treatment modalities, the review by Weigel *et al.* indicated that burr-hole craniostomy has the best cure to complication ratio.^[27] The authors evaluated the various methods of hematoma evacuation with regard to clinical variables of cure rate, recurrence, morbidity, and mortality as published in the English and German literatures and concluded that burr-hole craniostomy “shares the advantages of twist drill craniostomy, with its high cure rate and low risk of morbidity and mortality, and of primary craniotomy, with its low risk of recurrence.”^[27]

Six of the respondents place subdural drains and all of them reported recurrence rates of 1-5%. Five of the eight who do not employ the use of drains reported no recurrence while the remaining three reported rates of 1-5% (two) and 6-10% (one). These differences were statistically significant ($P = 0.0309$) in contrast to findings from the United Kingdom and the Republic of Ireland.^[21] While there is ongoing debates about whether or not to drain, Santarius *et al.* recently advocated the preference for drain after burr-hole drainage of CSDH.^[20]

Traditionally, CSDH patients are nursed flat and mobilized late in an effort to reduce hematoma recurrence.^[14,16] This may explain why some of the respondents mobilize their patients as late as the 7th to 10th days postdrainage. We have recently shown that there is no significant complication referable to the specific type of mobilization (early [day 2] or late [day 7]).^[2]

It is instructive to note that postoperative CT scanning is not routine in Nigeria in contrast with practices in some developed countries.^[8] Two of the three respondents who perform routine postoperative CT scanning work in private settings. This relative nonuse of postoperative CT may be related to the fact that CT machines are not available in some Nigerian neurosurgical centers and where they are available, they often malfunction and may not be repaired for use for several months. Moreover, the cost of a CT study (average N35000.00 or \$230) is beyond what the average Nigerian could afford. As such CT scanning is only done when it is considered absolutely necessary.

One significant limitation of this study is the potential effect of nonresponders on the findings. It is possible that the practices of many of the nonresponders differ from those of the respondents. However, given the

close interaction between, and the small number of, Nigerian neurosurgeons as well as the fact that most are trained in or affiliated to the three major local training centers (Ibadan, Lagos, and Sokoto), it is most probable that these findings are representative of the general neurosurgical practice in Nigeria.

CONCLUSION

This study has shown that there are several differences in the ways Nigerian neurosurgeons manage CSDH. The relatively high cost of CT scanning in Nigeria, its lack of general availability in Nigerian hospitals as well as the high-frequency of malfunctioning of the available CT scanners may contribute to the rarity of postoperative CT monitoring reported in this study. Future studies may help to streamline the approaches to managing CSDH.

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