Practice of treating Chronic Subdural Hematoma (cSDH) among Neurosurgeons in Nepal: A nationwide survey with literature review

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Date of submission: 28th December 2022 Date of acceptance: 13th February 2023 Date of publication: 30th March 2023

Abstract

Objectives: To survey Nepali neurosurgeons regarding the practice of managing chronic subdural hematomas (cSDH).

Methods and Materials *:* A survey questionnaire was sent to all neurosurgeons practicing in Nepal from the database of the Nepalese Society of Neurosurgeons (NESON).

Results: 60% (50/84) responded to the questionnaire. There was variation in practice among neurosurgeons regarding the use of drain and the administration of antiepileptics. However, many concurred regarding postoperative computed tomography scan, size of the burr hole, and positioning after surgery.

Conclusion: For a common neurosurgical procedure like drainage of cSDH, scientific evidence keeps on changing. Based on the available evidence we need to change our practice for the best possible outcomes. For most of the variables studied, there is concordance with available scientific evidence among neurosurgeons regarding cSDH management in Nepal.

Key words: Burr hole, chronic subdural hematoma, trauma

Introduction

The incidence of Chronic Subdural Hematoma (cSDH) is steadily increasing as the population ages and more people are on anticoagulants. The overall incidence is estimated between 1.7 to 20.6 per 100,000 population.[1,2]

Access this article online

Website: https://www.nepjol.info/index.php/NJN

DOI: https://doi.org/10.3126/njn.v20i1.50866

HOW TO CITE

Sedain G, Pradhanang AB, Rajbhandari B, Sharma MR. Practice of treating Chronic Subdural hematoma (cSDH) among Neurosurgeons in Nepal: A nationwide survey with literature review. NJNS. 2023;20(1):53-62.

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ISSN: 1813-1948 (Print), 1813-1956 (Online)

Materials and Methods

Online Questionnaires were distributed to the registered members of the Nepalese Society of Neurosurgeons (NESON), from April 4, 2020 to April 21,2020. Questionnaires were made using Survey Monkey https://www.surveymonkey.com/results/SM-FLQNNKCN7/ The questionnaire included information about the duration of practice of neurosurgery, the preferred method of treating cSDH using single or double burr holes or the use of twist drill or craniotomy, number of cases operated annually, size of burr hole made, placement of a drain, washing of subdural space, placement of head position after surgery, use of prophylactic anti-epileptic drugs (AEDs), perioperative antibiotic prophylaxis use and preference of postoperative computed tomography (CT) scan. Study was approved by the Institutional Review Board of Institute of Medicine, Maharajgunj, Kathmandu. Consent was regarded as implied by the answer to the questionnaire. Requirement of informed consent was waived because of the anonymous nature of the data. PubMed was searched to review the current literature regarding each question.

Results

A total of fifty registered neurosurgeons answered the questionnaire. Mean answering time was 12 hours. Majority of the surgeons had been practicing neurosurgery for 5 -10 years (42%). (Fig. 1)

Most of the surgeons (74%) preferred a single burr hole instead of double burr holes. None did twist drill craniostomy or mini craniotomy for evacuation of cSDH. (Fig.2)

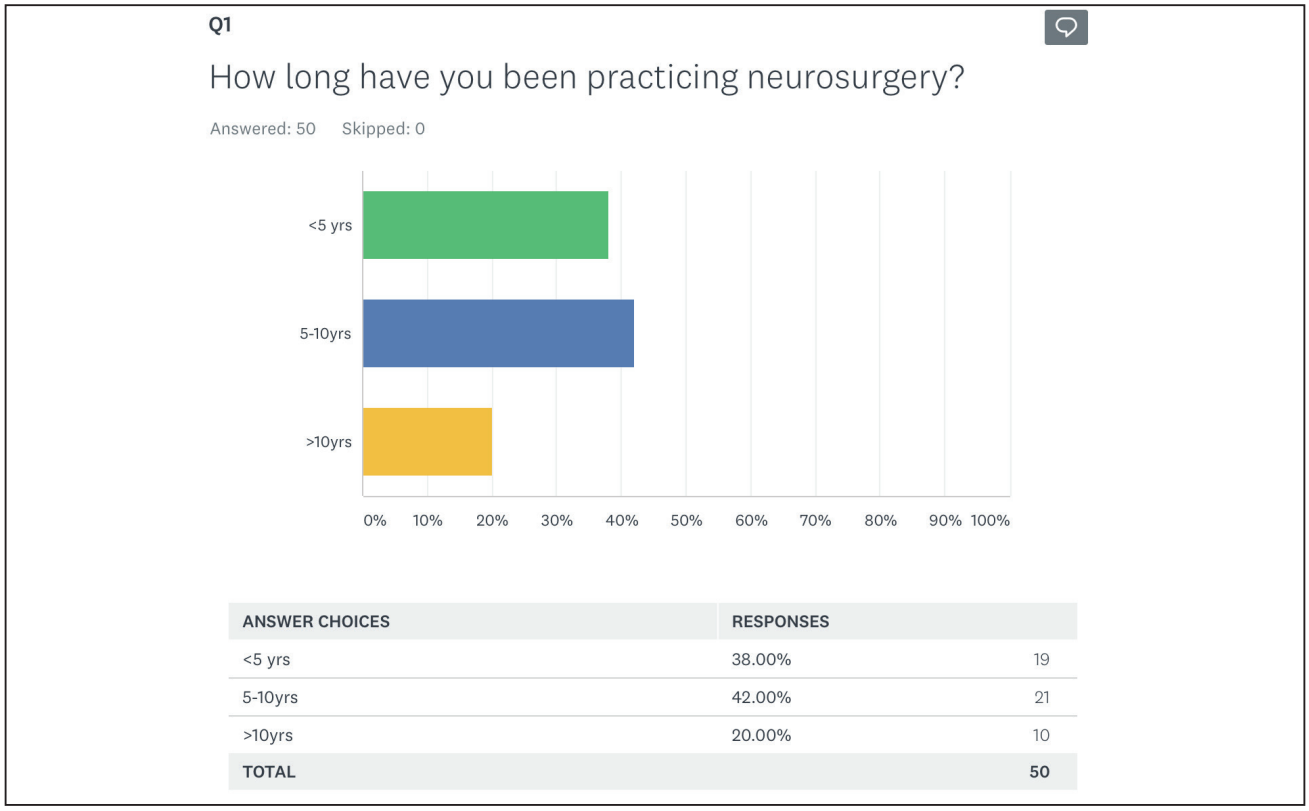
The majority of the surgeons (40% + 40%) individually managed up to 50 cases annually. A few surgeons managed over 100 cases. (Fig 3). Most preferred the size of the burr hole about 2.5cm. (Fig 4)

About half of the surgeons (34% +18%) placed some kind of drain intraoperatively, although the position of the drain differed. (Fig 5). All (100%) washed the subdural space with normal saline. (Fig 6)

Majority place the head of the patient flat postoperatively for up to 24 hours (46%) or up to 48 hours (44%). Only a few surgeons (6%) did not prefer placing the head flat postoperatively. (Fig 7)

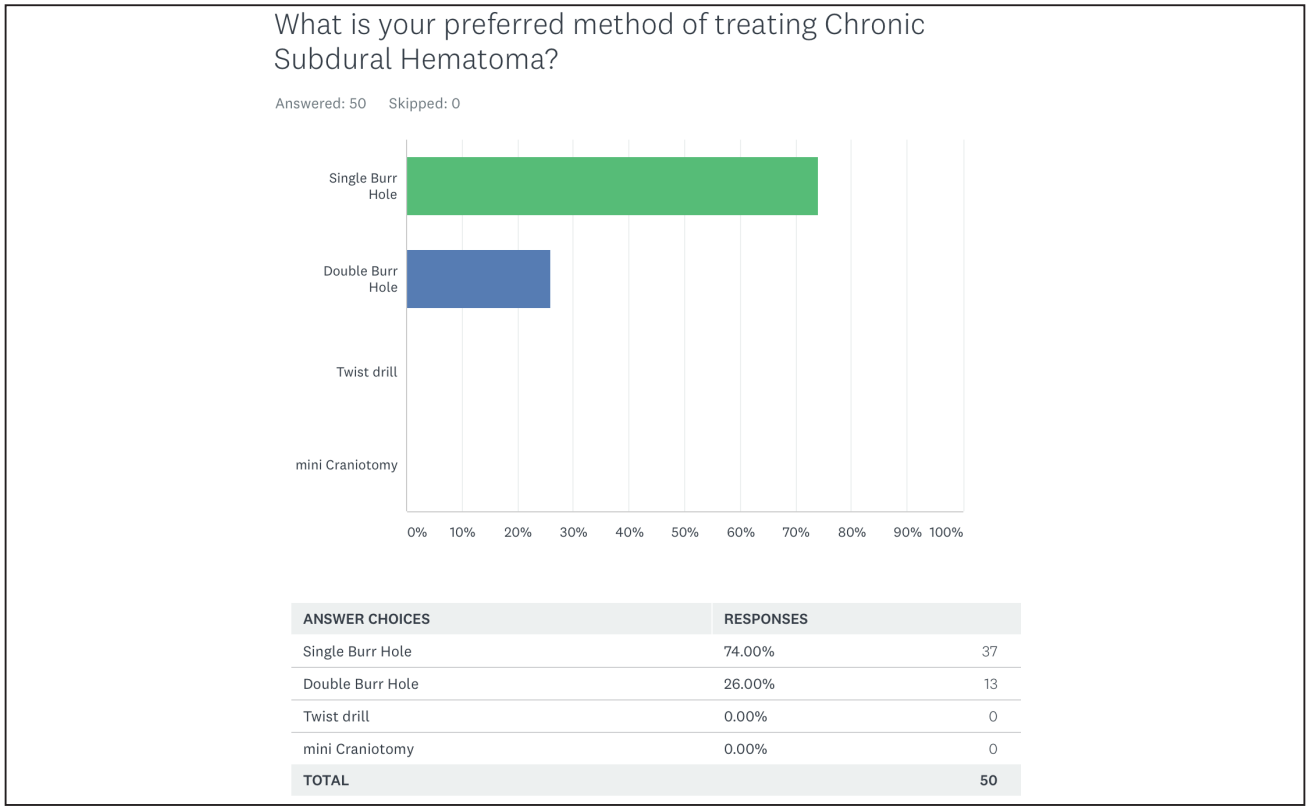
Only a minority (20% +10%) believed in administering post-operative prophylactic AEDs for some duration postoperatively. (Fig 8)

The majority (54%) gave perioperative antibiotics for up to 5 to 7 days. Only a few (18%) gave a single preoperative dose of antibiotics. (Fig 9). The majority (48%) did a post-operative CT only if the patient was symptomatic. (Fig 10)



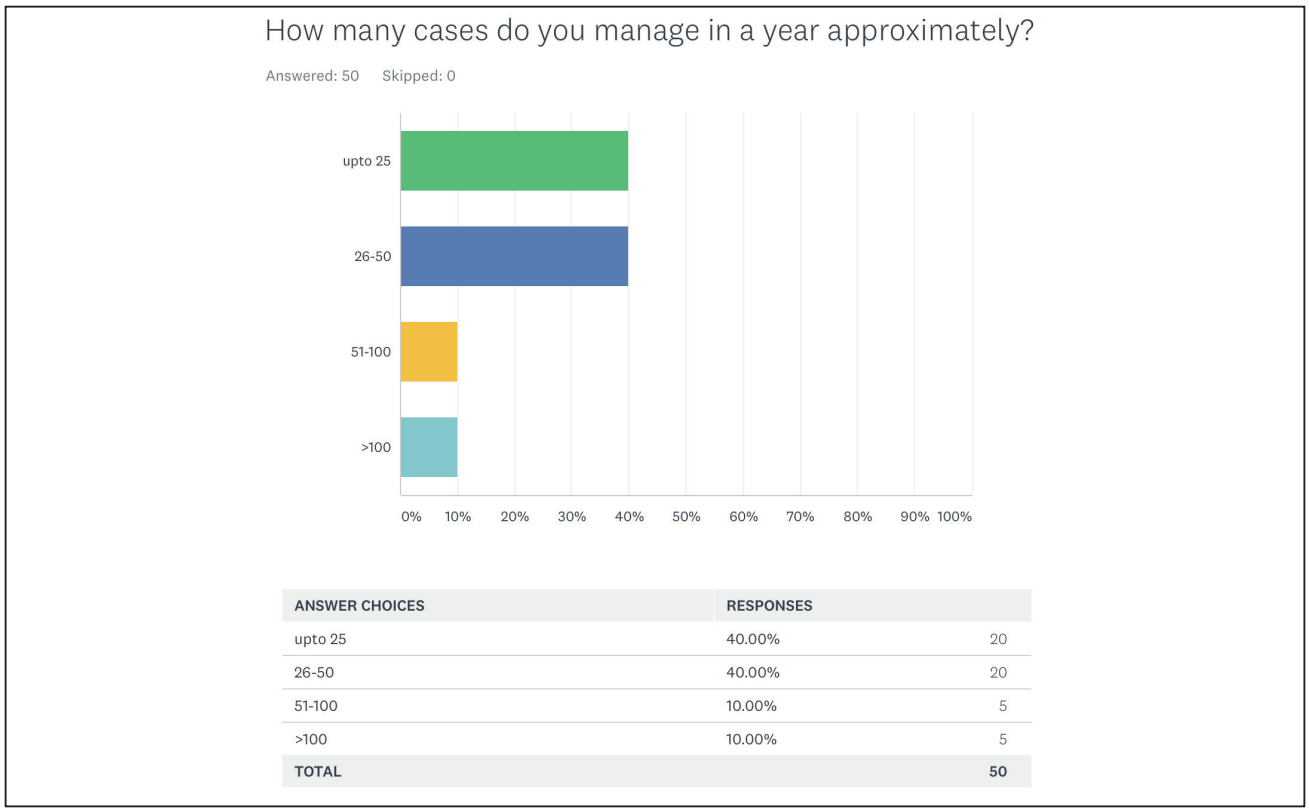
ANSWER CHOICES	RESPONSES	
<5 yrs	38.00%	19
5-10yrs	42.00%	21
>10yrs	20.00%	10
TOTAL		50

Figure 1



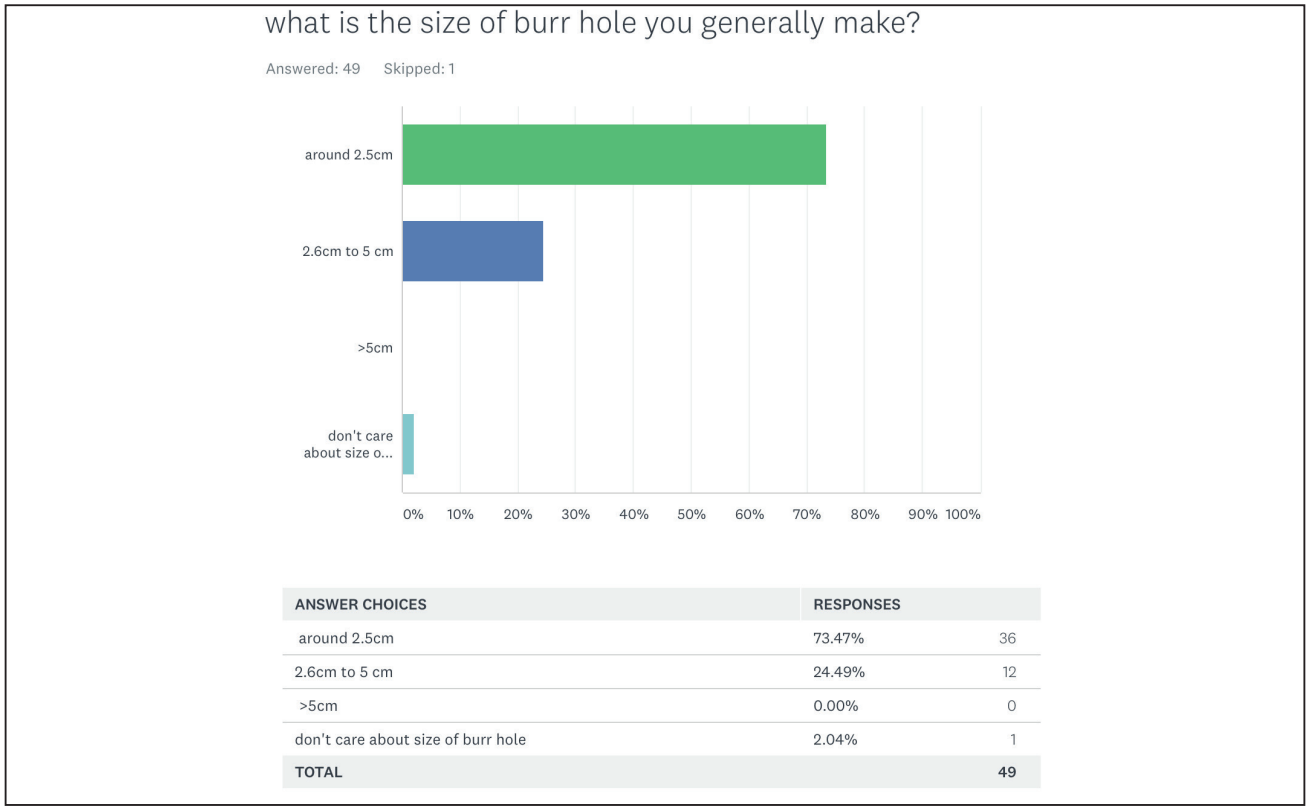
ANSWER CHOICES	RESPONSES	
Single Burr Hole	74.00%	37
Double Burr Hole	26.00%	13
Twist drill	0.00%	0
mini Craniotomy	0.00%	0
TOTAL		50

Figure 2



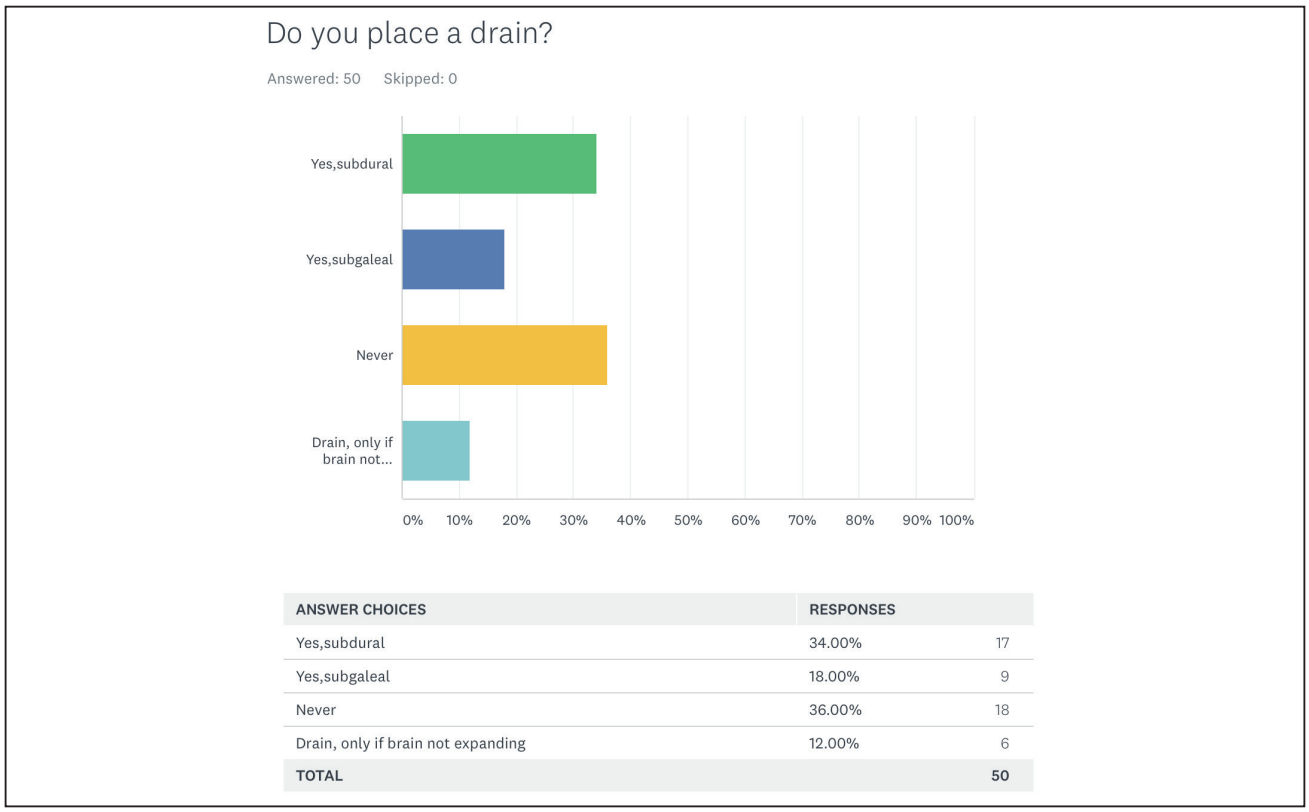
ANSWER CHOICES	RESPONSES	
upto 25	40.00%	20
26-50	40.00%	20
51-100	10.00%	5
>100	10.00%	5
TOTAL		50

Figure 3



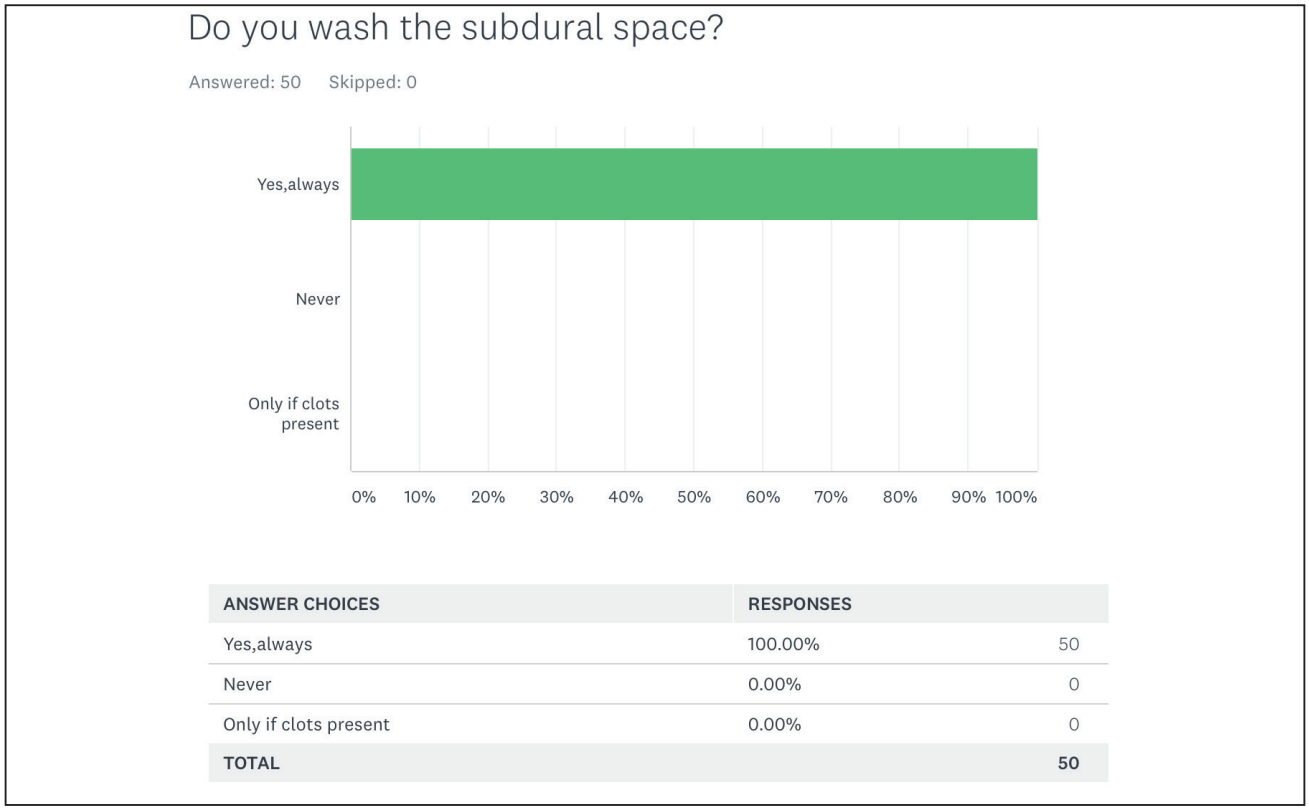
ANSWER CHOICES	RESPONSES	
around 2.5cm	73.47%	36
2.6cm to 5 cm	24.49%	12
>5cm	0.00%	0
don't care about size of burr hole	2.04%	1
TOTAL		49

Figure 4



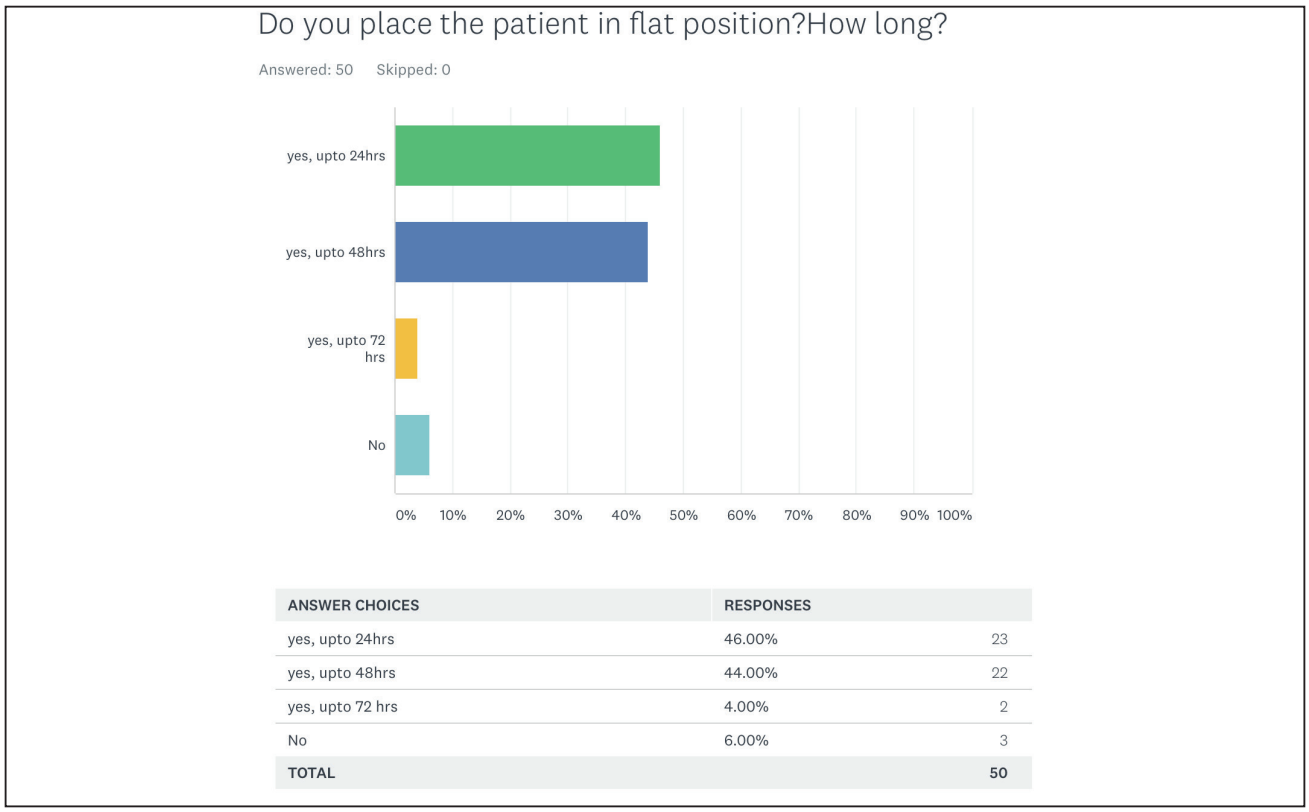
ANSWER CHOICES	RESPONSES	
Yes,subdural	34.00%	17
Yes,subgaleal	18.00%	9
Never	36.00%	18
Drain, only if brain not expanding	12.00%	6
TOTAL		50

Figure 5



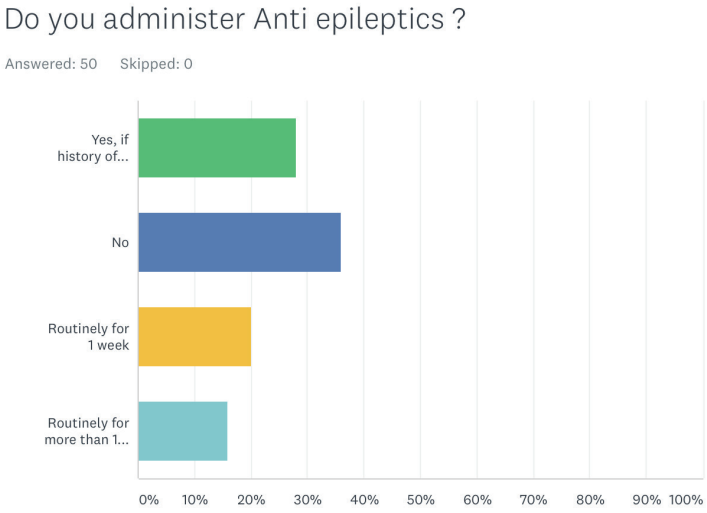
ANSWER CHOICES	RESPONSES	
Yes,always	100.00%	50
Never	0.00%	0
Only if clots present	0.00%	0
TOTAL		50

Figure 6



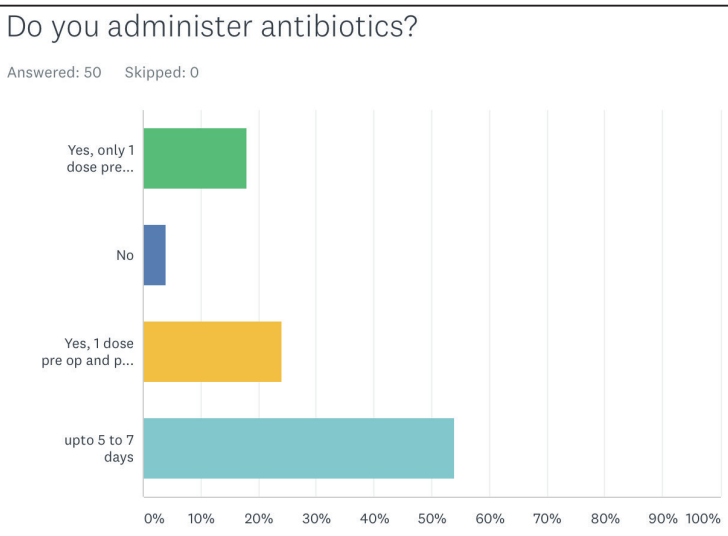
ANSWER CHOICES	RESPONSES	
yes, upto 24hrs	46.00%	23
yes, upto 48hrs	44.00%	22
yes, upto 72 hrs	4.00%	2
No	6.00%	3
TOTAL		50

Figure 7



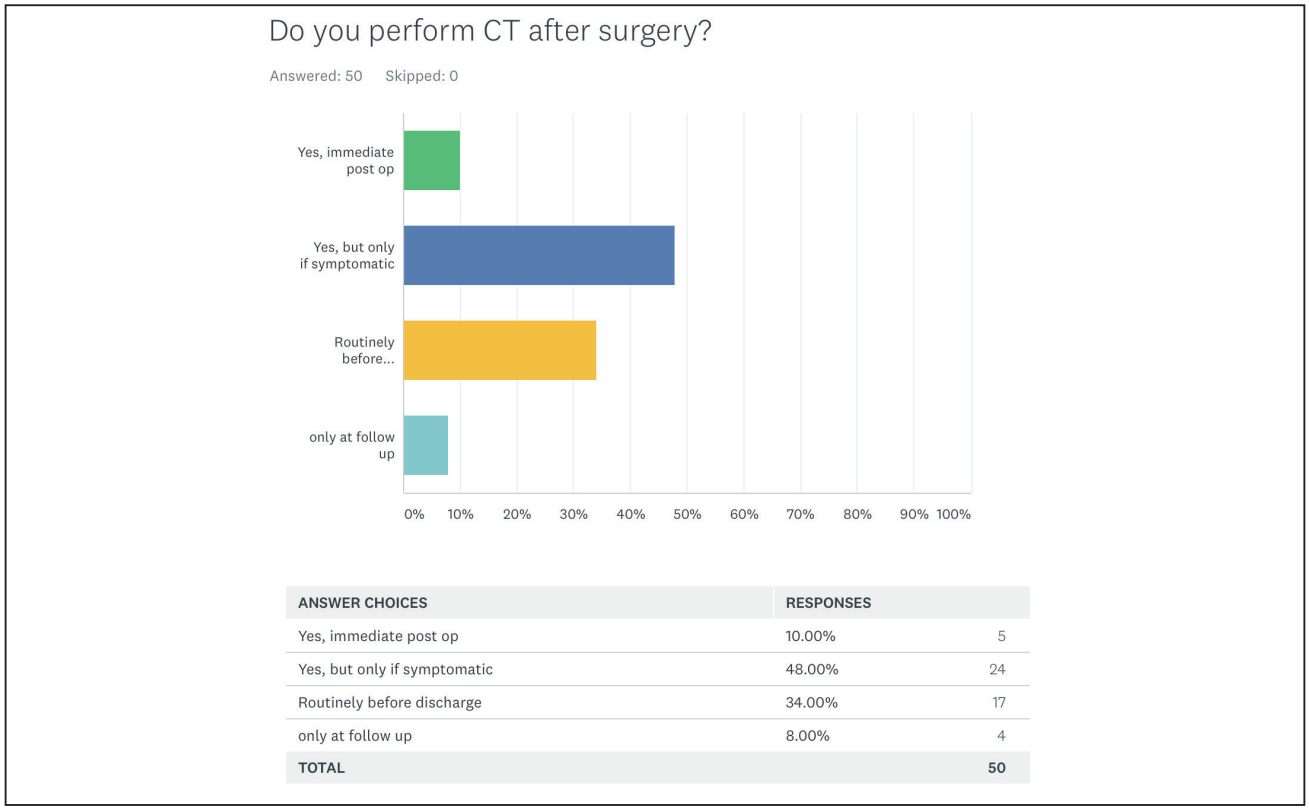
ANSWER CHOICES	RESPONSES	
Yes, if history of seizures	28.00%	14
No	36.00%	18
Routinely for 1 week	20.00%	10
Routinely for more than 1 week	16.00%	8
TOTAL		50

Figure 8



ANSWER CHOICES	RESPONSES	
Yes, only 1 dose pre operative	18.00%	9
No	4.00%	2
Yes, 1 dose pre op and post op each	24.00%	12
upto 5 to 7 days	54.00%	27
TOTAL		50

Figure 9



ANSWER CHOICES	RESPONSES	
Yes, immediate post op	10.00%	5
Yes, but only if symptomatic	48.00%	24
Routinely before discharge	34.00%	17
only at follow up	8.00%	4
TOTAL		50

Figure 10

Discussion

There were 84 registered neurosurgeons catering to a population of 29 million people in Nepal at the time of the survey. Among the respondents, 20% had been practicing neurosurgery for more than 10 years. While young neurosurgeons (working for less than 5 years) constituted 38%, majority of them (42%) had been working for 5 to 10 years. Most respondents (80%) had a caseload of up to 50 cases annually. Few (10%) handled more than 100 cases every year.

Preferred surgical method

There is a lot of dilemma and variation regarding whether to use a single burr hole or make double burr holes instead. While making a single burr hole saves time and resources, the risk of recurrence due to inadequate drainage always remains. The majority of our colleagues (74%) preferred a single burr hole for draining the cSDH while others (26%) routinely used two burr holes. None of the surgeons have been currently using twist drill craniostomy or mini-craniotomy for the treatment.

A retrospective analysis of 267 patients managed by either single or double burr hole showed that recurrence rates were not significantly different (chi^2; p>0.05).[3] Another randomized control trial involving 254 patients, using single versus double burr hole drainage, showed that recurrence rate was not significant.[4] A prospective cohort study comparing single versus double burr hole surgeries also showed that there was no difference in outcome (p=0.54).[5] A meta-analysis including 12 studies, of which 3 were RCTs, showed that there were no significant difference in recurrence rate (odds ratio [OR], 1.28; 95% confidence interval [CI], 0.92-1.78; P =0.07), complication rate (OR, 0.74; 95% CI, 0.20-2.76; P = 0.11) and morbidity (OR, 1.38; 95% CI, 0.55-3.46; P = 0.58) between single burr hole and double burr hole in the treatment of cSDH.[6]

Based on this literature, a single burr hole seems not to be inferior to double burr holes in terms of recurrence in managing cSDH. The majority of practice in Nepal seems concordant with the available evidence.

Size of Burr hole

A large group of neurosurgeons (73.47%) prefer a size of about 2.5cm for the burr hole while a few (2.04%) are not specific about the size.

No literature on the ideal size of a burr hole for the drainage of cSDH was found. The large size (≥2.5 cm) of the burr holes allows a wide incision of the dura under vision. This offers efficient evacuation of the CSDH and also helps in visualizing the bleeders from the deep surface of the dura and the subdural membranes, hence good control of bleeding points can be achieved. The potential disadvantage is often cosmetic, due to the large size of burr holes.

Though none of our respondents have performed mini craniotomies for cSDH, reports of low recurrence especially in cases with inner membrane identifiable on CT scans are there. In a series of 29 patients operated on in the USA, mini craniotomy (4 cm bone flap) with careful fenestration of the inner membrane yielded excellent results with no recurrence.[7]

Placement of Drain

Most (52%) prefer some kind of drain placement intraoperatively either subdural (34%) or sub-periosteal (18%) however a significant group (36%) never place a drain.

A randomized controlled trial comparing the use of drains versus no drains after burr hole evacuation of cSDH, showed that it was safe and associated with reduced recurrence and mortality at 6 months.[8] Recurrence occurred in ten of 108 (9.3%) patients with drain, and 26 of 107 (24%) without (p=0.003; 95% CI 0.14-0.70). Another randomized control trial comparing subdural vs sub-periosteal drain placement showed that sub-periosteal drain placement led to a lower recurrence rate, fewer surgical infections, and lower drain misplacement rates.[9]

The placement of drains seems to be evidence-based and practiced by the majority in Nepal.

Irrigation of the subdural space

All of the surgeons wash the subdural space using 0.9% saline (normal saline). However, there are conflicting reports on the use of irrigation.

One study from China showed no significant difference in recurrence between the irrigation and no irrigation group but had more pneumocephalus in the irrigation group.[10]Aoki et al., in their study found that intraoperative irrigation significantly reduced the recurrence rate (from 29.2 to 6.7%), but the use of irrigation had no impact on morbidity or mortality.[11]There is an ongoing multicenter randomized FINISH Trial (Finnish study of intraoperative irrigation versus drain alone after the evacuation of chronic subdural hematoma) to look into the effect of irrigation in CSDH.[12]

A meta-analysis of different irrigation fluids showed artificial cerebrospinal fluid (CSF) irrigation significantly reduced recurrence when compared with normal saline as the composition of artificial CSF is similar to that of human CSF. [13]

In a recent randomized control trial study from Sweden, irrigation by the fluid at body temperature was better than fluid at room temperature in terms of recurrence. There were 16 of 264 recurrences (6%) requiring re-surgery in the body temperature group whereas 39 of 277 recurrences (14%) needed reoperation in the room temperature group. (odds ratio,2.56;95%CI; P<0.01)[14]

Head position post-operative

Most place the patient's head flat for up to 24 hours (46%) or up to 48 hours (44%). Only a few (6%) do not agree to put the patient flat post-operative.

A prospective study enrolling 84 consecutive patients, allocated to either a supine position for 3 days or head elevated to 30 to 40 degrees for the same duration after burr hole drainage using a closed drainage system for cSDH showed that head elevated position was associated with a significant increase in the incidence of recurrence (P = 0.02) with no significant increase in post-operative complications like atelectasis (P = 0.41) or pneumonia (P = 0.72).[15] However, a meta-analysis including 4 controlled studies comparing the frequency of symptomatic recurrences 0.51 ([95% CI: 0.22-1.16]; P=.11), reoperations 1.07 ([95% CI: 0.42-2.69]; P=.89) or medical complications 1.15 ([95% CI: 0.7-1.91]; P=.58) among patients who were maintained in a head flat versus head elevated position post-operative after burr hole drainage did not show any significant differences.[16] In a prospective randomized study, post-operative bed elevation was not associated with increased recurrence. Moreover, it is advantageous to reduce post-operative complications including atelectasis and pressure sores.[17]

Post-operative Anti-epileptic drugs (AEDs)

The use of post-operative prophylactic AEDs is controversial. The overall incidence of postoperative seizures varies widely from 2.2% to 13.6%.[18-22] A study from Nepal showed an overall incidence of 5.7%.[23]

Majority of the surgeons (64%) in this survey did not use post-operative prophylactic AEDs. Few routinely use the drugs for one week postoperatively (20%) and more than 1 week postoperatively (16%).

A retrospective study on surgically treated patients with cSDH showed an effective reduction of seizures by using prophylactic phenytoin (OR 0.1, 95% CI 0.0–0.4, p = 0.0002); however, the benefit in terms of outcome is not precisely described.[24] In contrast, a retrospective study showed no benefit in patients treated prophylactically with AEDs (OR 1.3, 95% CI 0.4–3,9, p = ns). [25] A Cochrane database review conducted in 2013, concluded that there were no randomized controlled trials to formally recommend the use of prophylactic AEDs in patients with cSDH. [26] A retrospective chart review including 220 patients showed that the incidence of postoperative seizures was low (2.3%) and advised against the usage of routine AED prophylaxis if other risk factors for seizure did not exist.[27] Our randomized control trial itself, did not show any significant difference in seizure frequency related to the prophylactic administration of AEDs (p=0.26). [23]

Post-operative antibiotics

The majority (54%) use perioperative antibiotic prophylaxis for 5 to 7 days postoperatively. While only 4% do not use any perioperative antibiotics or only 1 dose preoperative (18%). This finding is in contrast with the international guidelines like the Scottish Intercollegiate Guidelines Network (SIGN 104) which advocates for the use of a single dose of preoperative antibiotic for clean neurosurgical procedure.[28] Even in conditions where a subgaleal or a subdural drain is placed postoperatively, it has been observed that stopping prolonged antibiotics did not increase the surgical site infection rate.[29]

In view of rising antibiotics resistance and costs incurred, it seems prudent.

Post-operative imaging

A significant number of surgeons routinely perform post-operative CT either immediately (10%) or before discharge (34%). However, the majority do not follow the practice unless symptomatic (48%) or only at follow-up (8%).

In a study comparing routine post-operative CT scans versus no routine CT scan, there was no significant help from routine scans as all those who needed reoperations had a clinical decline beforehand. [30]

Conclusion

cSDH is a common neurosurgical problem with surgical treatment performed in most centers. However, the practice patterns differ in various centers and individual surgeons. As far as possible, it is better to generate scientific evidence and follow them accordingly for the benefit of patients.

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