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Trapped temporal horn: From theory to practice, a systematic review of current understanding and future perspectives

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ABSTRACT

Background: The Entrapped Temporal Horn (ETH) is characterized by localized enlargement of the temporal horn of the lateral ventricle of the brain. This study aimed to investigate the factors, development, prognosis, and effective treatment.

Methods: Following the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines, a systematic search was conducted in major research databases. The inclusion criteria included patients of all ages with TTH diagnosis in cohort studies, case series, and case reports.

Results: Our study included 160 patients and 49 studies. The major causes of TTH were neoplastic lesions (42.3%), infections (22.3%), and cystic disease (13.08%). Of these cases, 71 were unrelated to cranial surgery, while 89 were unrelated to prior surgeries. Headache was the most common symptom (41.91%), followed by seizures (13.20%), drowsiness (12.50%) and memory loss (11.00%). Surgery was not required in 17 patients. Fenestration of the trapped temporal horn was performed in 24 patients, while VP/VA shunt surgeries were performed in the majority (57 patients) owing to favorable outcomes, lower revision rates, and extensive experience. However, TTH recurred in six of the 21 patients who underwent endoscopic ventriculocisternostomy. Tumors were the main cause, and isolated headache was the most frequent symptom. Ventriculoperitoneal shunts (VPS) are preferred because of their positive outcomes, lower revision rates, and wider expertise. Tumors near the trigonal area pose a higher risk.

Conclusion: Although TTH remains a rare condition, VPS continues to be the most widely preferred procedure among surgeons.

1. Introduction

Entrapped Temporal Horn (ETH), also referred to as Trapped Temporal Horn (TTH), is a rare form of noncommunicating localized hydrocephalus caused by trauma, intraventricular infections, intraventricular hemorrhage, or postoperative alterations following intraventricular surgery. The choroid plexus of the temporal horn continues to create CSF, and an obstruction in its outflow causes the temporal horn to enlarge progressively. The clinical condition is caused by the dilated temporal horn's mass influence on the surrounding structures.[1,2] Increased internal pressure caused by a solitary, larger temporal horn may eventually cause uncal herniation. Additionally, the presence of trapped cerebrospinal fluid (CSF) spaces can occasionally make the treatment of hydrocephalus more challenging for surgeons.[3]

ETH has been linked to a triad of homonymous hemianopsia, hemiparesis, and memory loss; however, solitary headache is the most

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common presenting symptom. Computed tomography (CT) and magnetic resonance imaging (MRI) are imaging techniques used to identify ETH.[4] The insertion of a ventriculoperitoneal shunt (VPS) has been the standard treatment for successful decompression of TTH. High revision rates in the long-term follow-up are a result of postoperative complications such as mechanical obstruction and infection, which are still frequent despite advancements in surgical techniques and implants that have increased shunt durability. Temporary external drainage, temporal horn-peritoneal shunting, temporal-to-frontal horn shunt (TFHS), endoscopic choroidal fissure fenestration, open surgery, and other therapeutic methods have all been documented for entrapped temporal horns.[5–7]

This systematic review highlights various treatment modalities for TTH and explores their significance in the context of enhancing the Glasgow Coma Scale (GCS) score, reducing mortality rates, and consequently contributing to an overall improvement in the quality of life of affected individuals, which may pave the way for advancements in TTH management, ultimately enhancing patient outcomes and well-being.

2. Methodology

2.1. Literature review

We conducted a comprehensive search of several databases, including PubMed, Scopus, Medline, Google Scholar, and ScienceDirect. The search was performed on April 30, 2023, and encompassed all available data. The search terms used were "temporal horn entrapment" (in all fields) OR "trapped temporal horn." No language restrictions were applied. Additional sources were considered to identify relevant records.

2.2. Study selection

Our systematic review included studies with human participants diagnosed with or suspected of having TTH, regardless of the cause or medical condition. We considered various types of research articles (randomized controlled trials (RCTs), observational studies, cross-sectional studies, case reports, and case series) that discuss interventions, diagnostic methods, or outcomes related to TTH. We reviewed 49 articles from an initial pool of 213 after eliminating duplicates and irrelevant papers (Fig. 1).

3. Eligibility criteria

Articles were considered for inclusion in the systematic review of patients of any age diagnosed with TTH. The studies were cohort studies, case series, and RCTs, regardless of the sample size or publication status. The control intervention could be a placebo or a population that did not receive therapy. The outcome measures included a decrease in patient symptoms and mortality. Studies with insufficient or missing data, including abstracts without full texts, were excluded. The review process

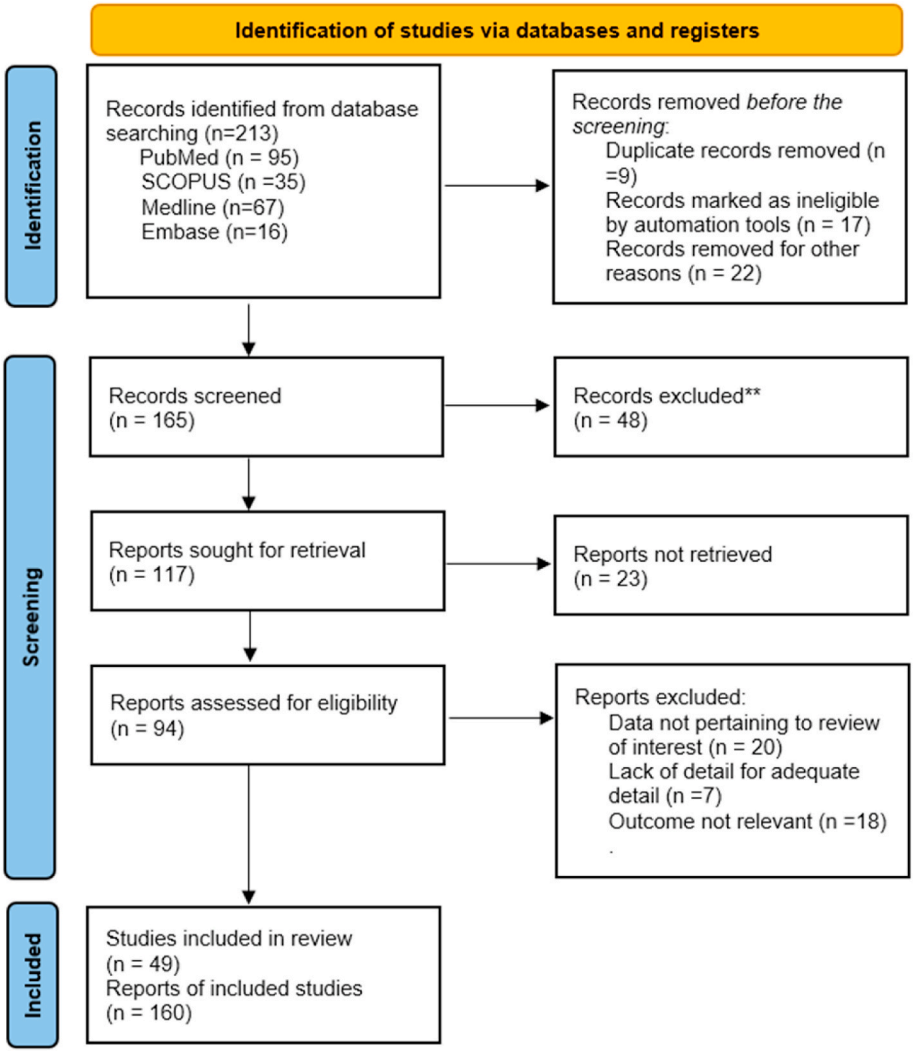

Fig. 1. Prisma flow chart.

followed the approach recommended bythe Cochrane Handbook of Systematic Review and Intervention and PRISMA Guidelines 2020.[8]

3.1. Data extraction

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4. Results

We conducted a thorough analysis of a pool of 49 articles, which included a total of 160 cases involving the condition known as a TTH. A complete table with the baseline characteristics is included in Table 1.

Among these 49 studies, 7 were retrospective studies, and 24 cases were derived from a retrospective study where complete patient data, typically found in case series, were not available. Therefore, our study focused on 150 patients, with a median age of 35 years, ranging from 0 to 81 years. Our analysis included 78 males and 76 females, resulting in a balanced male-to-female ratio of 1:1. Sex information was not provided in two cases, and one retrospective study lacked sex data. Among the studies examined, neoplastic lesions were identified as the primary cause of TTH in the majority of cases (n = 55, 42.3%) (**Table 2**). It is noteworthy that tumors located near the trigonal area significantly increased the risk of developing TTH. However, it is important to acknowledge that out of all the cases, 71 were unrelated to cranial surgery, while 89 were likely a consequence of previous cranial surgical procedures. Furthermore, infections (n = 29, 22.3%) and cystic diseases (n = 17, 13.08%) were also significant factors contributing to the occurrence of TTH, despite the fact that tumors and trigonal area surgeries were considered particularly influential.

Concerning the clinical presentation, headaches were the most commonly reported symptom among patients with TTH, accounting for 41.91% of cases. This symptom was observed regardless of sex or age. Seizures (13.20%), drowsiness (12.50%), and memory deterioration (11.00%) were also frequently documented in patients with TTH. Surgical treatment was not deemed necessary in 17 cases. Among these patients, 15 reported a favorable outcome, while 2 patients died due to the underlying disease. FTHS was used as a definitive treatment option in approximately 24 cases, with only 2 patients requiring revision of the procedure. Nonetheless, all patients achieved favorable outcomes.

VP/VA shunt procedures were performed in most TTH cases, specifically in 57 patients. However, TTH recurred in 8 patients, with 5 cases experiencing shunt malfunction, 1 case encountering shunt migration, and 3 cases developing shunt-related infections. Additionally, 4 patients experienced complications related to TTH. Among these cases, 4 patients underwent shunt revision, while 3 opted for endoscopic ventriculocisternostomy as a definitive procedure. Overall, 49 patients underwent VP/VA shunting as conclusive and definitive treatment, with favorable outcomes observed in most cases. It is noteworthy that only 3 patients died during the follow-up period, and no severe perioperative complications were encountered during the procedures.

Endoscopic ventriculocysternostomy was performed in 21 patients, and TTH recurrence was observed in 6 patients. Of these six patients, five underwent a repeat of the same procedure, while the remaining four patients opted for different procedures as definitive treatments. Consequently, endoscopic ventriculocysternostomy was the definitive procedure in only 15 patients.

In cases in which the underlying pathology for developing TTH was a tumor, resection was deemed the most favorable definitive option.

Seven patients underwent endoscopic trigonal deconstruction as a treatment for TTH. As a result, each of these four patients underwent a secondary definitive procedure. Three patients underwent septostomy as a definitive procedure, while the remaining patients underwent residual tumor resection as the final procedure. No perioperative complications were reported; however, recurrence was observed in nearly 4 cases.

Five patients underwent temporal corticectomy, a procedure that involves creating communication between the temporal horn of the ventricular system and subarachnoid space. TTH recurrence was observed in only one patient who underwent temporal corticectomy, for which a VP/VA shunt was considered as a definitive treatment option. Therefore, corticectomy was considered a definitive treatment for only four patients. Choroid plexus coagulation was considered in four patients, but in three cases, it was used in combination with other procedures, such as ventriculostomy, tumor resection, and temporal corticectomy. Moreover, follow-up data were insufficient to draw conclusions about its efficacy, as only one case had available follow-up data. Two patients underwent open microsurgical trigonal adhesion debridement. No perioperative complications were reported, and favorable outcomes were observed. Additionally, 7 patients received external ventricular drainage (EVD) as the definitive treatment modality for TTH. However, only two patients (28.6%) reported favorable outcomes with this procedure.

5. Discussion

The etiology of ETH is diverse and involves various underlying causes and clinical presentations. Studies on ETH also exhibit methodological and population heterogeneity, which further complicates the establishment of consistent patterns. Among the 160 reviewed cases, almost half demonstrated a link between a previous intracranial surgery near the trigonal area and ETH. Surgical interventions in this region appear to increase the risk by inducing fibrosis and adhesion formation, thereby hindering CSF flow from the temporal horn. Infectious diseases played a role in 22.3% of cases unrelated to surgery, while cystic diseases were identified in 18.03% of cases. These conditions disrupt the ventricular system function and CSF circulation, ultimately leading to TTH.[9–11]

Lin et al reported 19 cases of TTH resulting from surgical manipulation of meningiomas and recommended surgical excision in cases with elevated intracranial pressure. However, mild symptoms may be managed conservatively with regular radiological monitoring, as supported by other studies.[12–15] The other half of the TTH cases are associated with infections, cystic diseases, and vascular disorders. Infections can cause inflammation and obstruction in CSF pathways, cystic diseases can disrupt normal anatomy, and vascular diseases, such as arteriovenous malformations (AVMs) or aneurysms, can alter blood flow and pressure. Identifying the underlying cause is crucial for determining the appropriate management strategy.[16–18]

Ellis et al reported 13 cases of TTH due to cystic diseases, successfully treated with endoscopic cyst removal. This intervention restores normal CSF dynamics and leads to positive long-term outcomes.[19] Both radiological follow-up and clinical presentation are pivotal for diagnosing and managing TTH. Symptoms may vary depending on the area predominantly affected by the mass effect, including increased intracranial pressure, motor deficits, seizures, memory impairment, and sensory aphasia.

The treatment modalities for ETH vary depending on the cause, symptom severity, and individual factors. Options include surgery, conservative management, or a combination of both. Surgical interventions address obstructions or cysts causing ETH, whereas conservative management focuses on symptom relief, monitoring, and associated condition management. The literature suggests that removal of underlying neoplasms is the preferred treatment, followed by VPS. The VPS provides relief from increased intracranial pressure symptoms but carries certain risks and may require revision.[19]

The FTHS, introduced in 2010, has shown promise as an alternative treatment for TTH. A 2023 study by Lin et al compared FTHS with VPS, highlighting its potential advantages when combined with stereotactic surgery. In the TFHS, moving the TTH to an adjacent CSF space enables shorter shunt system length, valveless shunting, reconstruction of a nearly physiological CSF channel, and avoidance of stomach problems, all of which reduce the likelihood of shunt failure and costs.[20,21] Further

Table 1
Baseline characteristics of included studies.

S. No	Author, year	Type of Study	No of cases	Age	Gender	Etiology of TTH	Type of procedures
1	Cairns and daniels 1947[22]	Case study	3	19 Years	Male	Penetrating wound, subependymal haemorrhage	Choroid plexus coagulation, Ventriculostomy, Resection of choroid plexus
2	Smith et al,1979[23]	Case study	3	47–65 years	1 Male, 2 Females	Trigonal lgg, Intraventricular meningioma	Tumor resection, Observational
3	Maurice-Williams and choksey (1986)[24]	Case study	3	23–35 years	3 Females	Postop, recurrent temporal hgg, Tuberculous meningitis, parietal avm with sah	Microsurgical opening of trigone stenosis, Choroid plexus coagulation (failed), Vas Craniotomy and decompression (failed), VPS
4	Kwame ofori kwakye et al,1986[25]-	Case study	1	35 years	Female	Cryptococcal meningoencephalitis	External Ventricular Drainage (EVD)
5	Schilt et al,1986[26]	Case study	1	33 years,	Female	Neuro sarcoidosis	Temporal cyst drainage (failed), VPS (2 mos. Later), VPS revision
6	Bruck et al,1991[27]	Case study	1	50 years	Male	Xanthogranuloma of choroid plexus	Lesion resection
7	Tsugane et al,1992[28]	Case study	2	34, 44 years	1 Male, 1 Female	Tuberculous meningitis, Multiple streptococcal abscesses	Ventriculoperitoneal Shunt (VPS) and pharmacological treatment
8	Bramwit et al,1997[29]	Case study	1	63 years	Female	Inflammatory pseudotumor of choroid plexus	Tumor resection and uos shunt
9	Cho et al,1998[30]	Case study	4	18–33 years	2 Male, 2 Female	Cryptococcal meningitis, Tuberculous meningitis	Ventriculoperitoneal Shunt (VPS) and pharmacological treatment
10	Watanabe and katayama,1999[31]	Case study	1	16 years	Male	Postop, intraventricular avm with sah	Ventriculoperitoneal Shunt (VPS)
11	Coria et al,2000[32]	Case study	1	70 years	Female	Postop, basilar giant aneurysm	Pharmacological treatment
12	Parrent,2000[33]	Case study	1	68 years	Female	Cryptococcal meningitis	Endoscopic ventriculocisternostomy
13	Yasuhara et al,2001[34]	Case study	1	72 years	Male	Parieto-occipital abscess	Temporal tip lobectomy with temporal horn opening and subdural peritoneal shunt
14	Russell and kelly,2002[35]	Case study	8	33–69 year	5 Male, 3 Female	Hippocampal lgg, Intraventricular meningioma	Tumor resection
15	Baussart et al,2006[36]	Case study	1	56 years	Female	Neurosarcoidosis	Endoscopic biopsy and pharmacological treatment
16	Mathews et al,2007[37]	Case study	1	23 years	Male	Cryptococcal meningitis	Endoscopic ventriculocisternostomy (failed), vps and pharmacological treatment
17	Maurya et al,2007[38]	Case study	1	25 years	Female	Trigonal hydatid cyst	Hydatid cyst removal and temporal cyst decompression
18	Berhouma et al,2009[39]	Case study	1	42 years	Female	Neurosarcoidosis	Temporal tip lobectomy with temporal horn opening and pharmacological treatment
19	Hervey-jumper et al,2010[40]	Case study	3	47–70 years	1 Male, 2 Female	Postop, atrial ependymoma, Trigonal B cell lymphoma, temporal hgg	Temporal to frontal shunt
20	Singh et al, 2010[41]	Case study	2	35 years	2 Female	Neurocysticercosis	Endoscopic atrium fenestration (failed), UOS shunt, Temporal horn cyst removal through transcortical approach
21	Kamali et al, 2011[42]	Case study	1	8 years	Female	Trigonal hydatid cyst	Hydatid cyst marsupialization and temporal cyst decompression
22	Yeon et al, 2011[43]	Case study	1	9 years	Female	Parieto-occipital avm treated with g knife	Uos shunt
23	Chen et al, 2013[44]	Case study	1	41 years	Female	Atypical trigonal meningioma in meningiomatosis	Stereotactic temporal horn to prepontine cistern shunt and radiosurgery on tumor
24	Krähenbühlet al, 2013[45]	Case study	4	9 Months-66 years	1 Male, 3 Female	Postnatal CNS infection, parietal lesion in systemic juvenile xanthogranuloma	Bilateral endoscopic ventriculocisternostomy, VPS, and endoscopic atrium fenestration
25	Iaccarino et al, 2013[46]	Case study	1	50 years	Male	Incidental finding	Bilateral vps
26	Quenardelle et al, 2013[47]	Case study	1	26 years	Male	Neurosarcoidosis	Vps
27	Sharma et al, 2014[48]	Case study	1	22 yrs, female	Female	Tuberculous meningitis	Vps and pharmacological treatment
28	Abderrahmen et al, 2015[49]	Case study	5	4 Months-48 years yrs	3 Male, 2 Female	Congenital hydrocephalus, Postop neurohydatidosis, occipital encephalocele	Endoscopic ventriculocisternostomy (failed), VPS, Observational, UOS shunt
29	Ellis et al, 2015[50]	Retrospective study	13	4 Months-32 Years	9 Male, 4 Female	Atrial arachnoid cyst, occipital horn arachnoid cyst, atrial subependymal cyst	Endoscopic cyst removal through occipital horn access
30	Hana et al, 2015[51]	Case study	1	60 years	Male	Postop, hgg	Transcortical Endoscopic Ventricular Drainage (Tevd) on POD 1, VPS on POD 10 (failed), endoscopic ventriculocisternostomy (1 month later)
31	Spallone et al, 2015[52]	Case study	1	58 years	Male	Postop, intraventricular uos tumor, and surgical inf	Trigone dilation and internal temporal to frontal shunt (failed): vps
32	Bohl et al, 2016[53]	Case study	3	53–63 years	2 Male, 1 Female	Postop, parieto-occipital avm with sah, intra ventricular abscess drainage hgg	VPS, Tevd
33	Alan et al, 2017[54]	Case study	1	76 years	Male	Basal ganglia ich with ivh	Tevd (removed on pod 3) and intrahematomal catheter
34	Paredes et al, 2017[55]	Case study	4	20–73 years	2 Male, 2 Female	Postop, temporal avm, choroid plexus carcinoma, atrium metastasis	Endoscopic ventriculocisternostomy
35	Sharifi et al, 2017[56]	Case study	1	16 years	Male	Incidental finding	Microsurgical ventricular-cysto-sternotomy (failed): vps (2 mos. Later)

(*continued on next page*)

Table 1 (*continued*)

S. No	Author, year	Type of Study	No of cases	Age	Gender	Etiology of TTH	Type of procedures
36	Arena-ruiz et al, 2018[57]	Case study	1	2 years	Male	Multiple fungal abscess	Endoscopic ventricular-cistern-ventriculostomy with trans-cisternal tevd positioning
37	Golpayegani et al, 2018[58]	Case study	1	6 Months	Male	Cong bilateral temporal horn entrapment	Bilateral vps
38	Haseqawa et al, 2018[59]	Case study	2	42, 80 years	2 Female	Postop, intraventricular avm, Cryptococcal choroid plexitis	Vps (failed), endoscopic ventriculocisternostomy
39	Zhang et al, 2018[60]	Case study	3	27–32 years	3 Female	Postop, intraventricular neurocytoma, atrial meningioma	Endoscopic atrium fenestration and septostomy, Endoscopic resection of tumor and atrial fenestration
40	Fernandez-de thomas et al, 2019[61]	Case study	1	53 years	Female	Chemical meningitis sec to ruptured spinal epidermoid cyst	Endoscopic exploration of right lateral ventricle and lumbar decompression with cyst resection
41	Huang et al, 2019[62]	Case study	2	16, 56 years	2 Male	Ventriculitis and ivh, Porencephalic cyst caused by periventricular encephalomalacia process	VPS, Endoscopic cystobentriculostomy with fenestration from trigone to frontal horn
42	Lin et al, 2019[63]	Retrospective study	19	32 years	6 male, 13 Female	Postop, trigonal meningioma	Observational, External Ventricular Drainage (EVD), and pharmacological treatment
43	Liu et al, 2019[64]	Case study	1	52 years	Female	Postop and G knife, trigonal meningioma	Recurrence tumor resection and choroid plexus coagulation
44	Sanchez carteyron al, 2019[65]	Case study	1	48 years	Male	Midline and trigonal hgg	Observational
45	Guigliano et al, 2020[66]	Case series	11	31–81 years	7 Male, 4 Female	Postop, trigonal avm, parietal hgg, parieto-temporal hgg, multicentric hgg, recurrent parieto-temporo-occipital hgg, intraventricular meningioma	VPS
46	Ren et al, 2021[67]	Retrospective study	10	16–65 years	4 Male, 6 Female	Central neurocytoma, Thalamic glioblastoma, Meningioma, Anaplastic ependymoma	Temporary Foramen of Monro Hematoma Shunt (Tfhs)
47	Yamamoto et al, 2022[68]	Case series	4	37 year	1 Male, 3 Female	Shunt infection, Ivh, Tumor resection, Shunt infection	Endoscopic ventriculocisternostomy & stent with acryl puncture needle
48	Liu et al, 2022[69]	Case series	1	59 years	Female	Ventricular trigonal mass	Ventriculoperitoneal Shunt (VPS)
49	Lin et al, 2023[70]	Retrospective study	Total 24 patients		NA	NA	13 Temporary Foramen of Monro Hematoma Shunts (Tfhs) & 11 Ventriculoperitoneal Shunts (VPS)

Abbreviations: TTH: Trapped Temporal Horn, lgg: Low-Grade Glioma, VPS: Ventriculoperitoneal Shunt, Evd: External Ventricular Drainage, POD: Postoperative Day, Tevd: Transcortical Endoscopic Ventricular Drainage, Tfhs: Temporary Foramen of Monro Hematoma Shunt, Ivh: Intraventricular Hemorrhage, NA: Not available.

Table 2
Distribution of cases by classification, highlighting the spectrum of pathological conditions and unknown factors in percentages.

Classification	No of Cases	Percentages
Tumor	55	42.3
Infection	29	22.3
Cystic Disease	17	13.08
Congenital	8	6.15
Inflammatory	7	5.38
Trauma	5	3.85
Hemorrhage	5	3.85
Idiopathic	4	3.07
Other (not known, cannot be classified)	30	

research and clinical trials are needed to establish its long-term efficacy and safety, with collaborative efforts among healthcare professionals.[20] A brief comparison between the VPS and the TFHS is presented in Table 3.

EVD is considered a short-term option for TTH, whereas endoscopic ventriculocisternostomy has a high revision rate and requires greater expertise. Consequently, FTHS and VPS have become more popular because of their favorable outcomes, lower revision rates, and greater experience available for these procedures.

This study underscores the multifaceted origins of TTH and its various clinical manifestations. Notably, it revealed a significant association between TTH and intracranial surgery, emphasizing the risks posed by surgical interventions. While surgical excision or endoscopic removal has proven effective, FTHS has emerged as a promising alternative, offering potential advantages in terms of efficacy, safety, and

Table 3
FTHS vs. VPS – A Quick Comparison on Shunt Length, Infections, Cosmetic Outcomes, Postoperative Pain, Brain Injury Risk, Siphoning Prevention, Over-drainage, and Cost-effectiveness.

FTHS	VPS
Shorter Shunt Length	
Reduces the risk of obstruction and infections, potentially lowering the need for revisions or reoperations due to shorter shunt length	Increases the risk of obstruction and infections, potentially lowering the need for revisions or reoperations due to greater short length
Intraperitoneal Infections	
Eliminates the possibility of intraperitoneal infections	Involves the peritoneal cavity, which carries the risk of intraperitoneal infections
Cosmetic Outcomes	
Improved cosmetic outcomes due to avoiding peritoneal incisions and associated scar	The peritoneal incision may result in visible scarring
Postoperative Pain	
Reduced postoperative pain due to avoiding trauma to the abdominal wall	Potential postoperative pain from trauma to the abdominal wall
Risk of Brain Injury	
Carries potential risks of brain injury due to two burr holes and brain passes	Carries less risk as compared to FTHS due to greater confidence by Surgeons
Prevention of Siphoning Phenomenon and Over-drainage	
Establishes direct communication between temporal and frontal horns, preventing siphoning and over-drainage	Siphoning phenomenon and over-drainage may occur with VPS
Cost-effectiveness	
Shown to be cost-effective compared to VPS	Not much cost-effective as FTHS

cost-effectiveness. These findings advocate tailored treatment strategies based on the diverse origins of TTH, emphasizing the significance of continuous research collaboration and clinical trials.

5.1. Limitations

One of our study's main limitations is the considerable heterogeneity observed in the data collected. This heterogeneity introduces significant variability across studies, thereby impeding the ability to perform comprehensive statistical analysis. Our literature review indicates a scarcity of RCTs on this topic. The existing literature primarily consists of case series studies along with a small number of recent retrospective studies. The absence of robust study designs has resulted in substantial data variability, which impedes the ability to draw definitive conclusions or generalize the findings.

6. Conclusion

In conclusion, the treatment for TTH varies according to the cause, symptoms, and patient characteristics. Neoplasm removal followed by VPS is common. Conservative management and cyst/neoplasm endoscopic removal are effective in treating mild and cystic TTH. The VPS provides feasibility, absence of dissemination risk, symptom relief, and reversibility. However, it carries surgical and device risks and mechanical failure and may require revision. FTHS is a promising alternative, offering shorter shunts, fewer complications, better cosmetics, and prevention of overdrainage. Further research, including trials and collaborations, is needed to understand and optimization. Long-term efficacy, safety profiles, and novel interventions should be explored to improve TTH outcomes.

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Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

CRediT authorship contribution statement

Muhammad Ashir Shafique: Writing – review & editing, Validation, Supervision, Data curation. **Muhammad Saqlain Mustafa:** Methodology, Data curation, Conceptualization. **Abdul Haseeb:** Methodology, Formal analysis, Data curation, Conceptualization. **Abdullah Mussarat:** Writing – original draft, Data curation. **Muhammad Arham Siddiq:** Methodology, Investigation, Data curation. **Muhammad Faheem Iqbal:** Writing – original draft. **Javed Iqbal:** Writing – review & editing, Validation. **Venkataramana Kuruba:** Methodology, Formal analysis. **Tirath Patel:** Writing – original draft.

Declaration of competing interest

The authors declare that they have no competing interests.

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Abbreviations

TTH: Trapped Temporal Horn
VPS: Ventriculoperitoneal Shunt
FTHS: Frontotemporal horn shunting
EVD: Extra ventricular Drain
CSF: Cerebrospinal fluid
ETH: Entrapped Temporal Horn