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Basilar artery occlusion management: An international survey of middle versus high-income countries

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Abstract

Background and Purpose: Two early basilar artery occlusion (BAO) randomized controlled trials (RCTs) did not establish the superiority of endovascular thrombectomy (EVT) over medical management. Yet many providers continued to recommend EVT. The goal of the present article is to compare physicians' diagnostic and management strategies of BAO among middle-income and high-income countries (MICs and HICs, respectively).

Methods: We conducted an international survey from January to March 2022 regarding management strategies in acute BAO, to examine clinical and imaging parameters influencing clinician management of patients with BAO. We compared responses between physicians from HIC and MIC.

Results: Among the 1245 respondents from 73 countries, 799 (64.2%) were from HIC, with the remaining 393 (31.6%) from MIC. Most respondents perceived that EVT was superior to medical management for acute BAO, but more so in respondents from HIC (98.0% vs. 94.2%, $p < 0.01$). MIC respondents were more likely to believe further RCTs were warranted (91.6% vs. 74.0%, $p < 0.01$) and were more likely to find it acceptable to enroll any patient who met a trial's criteria in the standard medical treatment arm (58.8% vs. 38.5%, $p < 0.01$).

Conclusions: In an area where clinical equipoise was called into question despite the lack of RCT evidence, we found that respondents from MIC were more likely to express willingness to enroll patients with BAO in an RCT than their HIC counterparts.

Keywords

Basilar artery occlusion, mechanical thrombectomy, intravenous thrombolysis, middle-income country, high-income country

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Background

Despite a well-established evidence for endovascular therapy (EVT) in anterior circulation acute large vessel occlusion (LVO) stroke since 2015,[1] randomized clinical trial (RCT) evidence to support EVT for basilar artery occlusion (BAO) has, until the May 2022 presentation of the ATTENTION[2] and BAOCHE[3] trial results, been absent. Published RCTs of posterior circulation LVO (BEST[4] and BASICS[5]) did not show a benefit of EVT over standard medical care. The results of these studies were limited by a slow recruitment and a moderate crossover rate in the BEST study.[4,5] Due to the poor natural history of BAO,[6] and the high degree of clinical efficacy of EVT in anterior circulation proximal LVO,[1] many providers have continued to treat patients with acute BAO[7] with EVT while awaiting RCT evidence.[8,9]

We recently surveyed a diverse international cohort of physicians involved in acute stroke care regarding their practice in BAO and found significant variation in responses

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based on their demographics, roles, and experience.[7] Despite little improvements in recent decades, research highlights that patients from low and middle-income countries (LMICs) have less access to clinical research trials and high-cost technology.[10–15] RCTs have the potential to improve resources and access to healthcare for patients in LMIC.[16] However care needs to be taken to safeguard against exploitation and "research tourism," especially in areas where best practice treatment has been established.[17] In this follow-up analysis to the After the BEST of BASICS (ABBA) survey, we sought to determine areas of clinical uncertainty in acute BAO treatment; whether decisions and willingness to participate in RCTs, vary according to the country's resources and if so, what learnings could be taken to influence future trial design.

Methods

Data is available from the corresponding author upon reasonable request.

The reader is referred to the primary report for detailed survey methodology.[7,18] The survey was conducted between January 18 and March 31, 2022. The online questionnaire was distributed internationally among members of the Dutch Neurovascular Society, the British and Irish Association of Stroke Physicians, Stroke Clinical Trials Network in Ireland, International Stroke Trial Network of a co-author (UF), the Brazil Stroke Society, German Stroke Trial Network, the Italian Stroke Association, the Japan Stroke Society, the Japan Society for Neuroendovascular Therapy, the European Stroke Organization blog, the Madrid Association of Neurology, the Colombia Association of Neurology, the Norway Stroke Organization, Indonesian Neurointerventionalists, the Society of Vascular and Interventional Neurology (SVIN) Membership List, the Global SVIN COVID-19 stroke registry, and via invitation by co-authors to their colleagues. The survey was also distributed via the Whatsapp or Telegram group for two Neurointerventional groups, the WeChat Stroke Network in China, MT2020, and Women in Neurointervention. Participant emails were obtained to prevent duplicate response bias.

Ethics

Approval by the local research ethics board was obtained via the coordinating center's hospital. The study was classified as exempt as it did not qualify as human subjects research.

Physician respondents were grouped by their country of practice, as defined by the World Bank country classifications by income level, 2021 to 2022.[19] Countries were stratified into high-income countries (HICs), high-middle income countries, LMICs and low-income countries (LICs) based on gross national income per capita in US dollars. For the purpose of this analysis, high-middle and low-middle income respondents were grouped as middle-income countries (MICs) due to the lower sample size of high-middle and low-middle income respondents.

Statistical analysis

Statistical analysis was performed using SAS 9.4 software (SAS Institute, Cary, NC, USA). The results were summarized using descriptive statistics (i.e. frequencies and percentages). Differences between the groups (age, gender, experience, specialty, continent, and country income) were assessed by the chi-square test or Fisher's exact test (when appropriate). A p-value of <0.05 was considered statistically significant for all tests. Figure 1 was created with Tableau.

Results

Demographic distribution

There were 1245 respondents from 73 countries, 799 (64.2%) from HIC, 393 (31.6%) were from high-middle income countries and 53 (4.3%) from LMICs. There were no respondents from LIC. Baseline characteristics of respondents are presented in Table 1.

Compared to respondents from HIC, those from MIC were more likely to be interventionists (59.2% vs. 34.9%, $p<0.01$), more likely to be male (79.8% vs. 72.3%, $p<0.01$), and more likely to have <10 years of experience as a senior decision maker (65.2% vs. 47.7%, $p<0.01$; Figure 1).

European respondents comprised 39.6% of all responses, followed by Asia, 33.3%, and North America, 18.8%. China, a high-middle income country, was the largest country in response, 23.7%, followed by the United States, a HIC, with 15.7%.

Decision to offer EVT in BAO in clinical practice

There was broad agreement that, in certain circumstances, EVT was superior to standard medical treatment (SMT) in patients with BAO; however, this perception was higher among those from HIC (98.0% vs. 94.2%, $p<0.01$). Respondents from MIC were more likely to report that the results of the BEST and BASICS RCT had altered their management of BAO (37.9% vs. 25.6%, $p<0.01$), and more likely to agree that further trials were warranted (91.6% vs. 74.0%, $p<0.01$; Table 2).

Respondents from MIC were more likely to select that, if their center were to take part in a RCT for thrombectomy in BAO, they would find it acceptable to enroll all patients who met trial criteria in the SMT arm (58.7% vs. 38.5%, $p<0.01$; Table 2).

Imaging selection

Respondents were asked their opinion of using a posterior circulation (pc)-ASPECTS threshold for patient selection to BAO EVT, and respondents from MIC were more likely to favor using a pc-ASPECTS threshold in selecting patients for EVT in BAO (40.2% vs. 29.5%, $p<0.01$).

In cases where clinicians felt advanced imaging, defined as any intracranial imaging other than a noncontrast

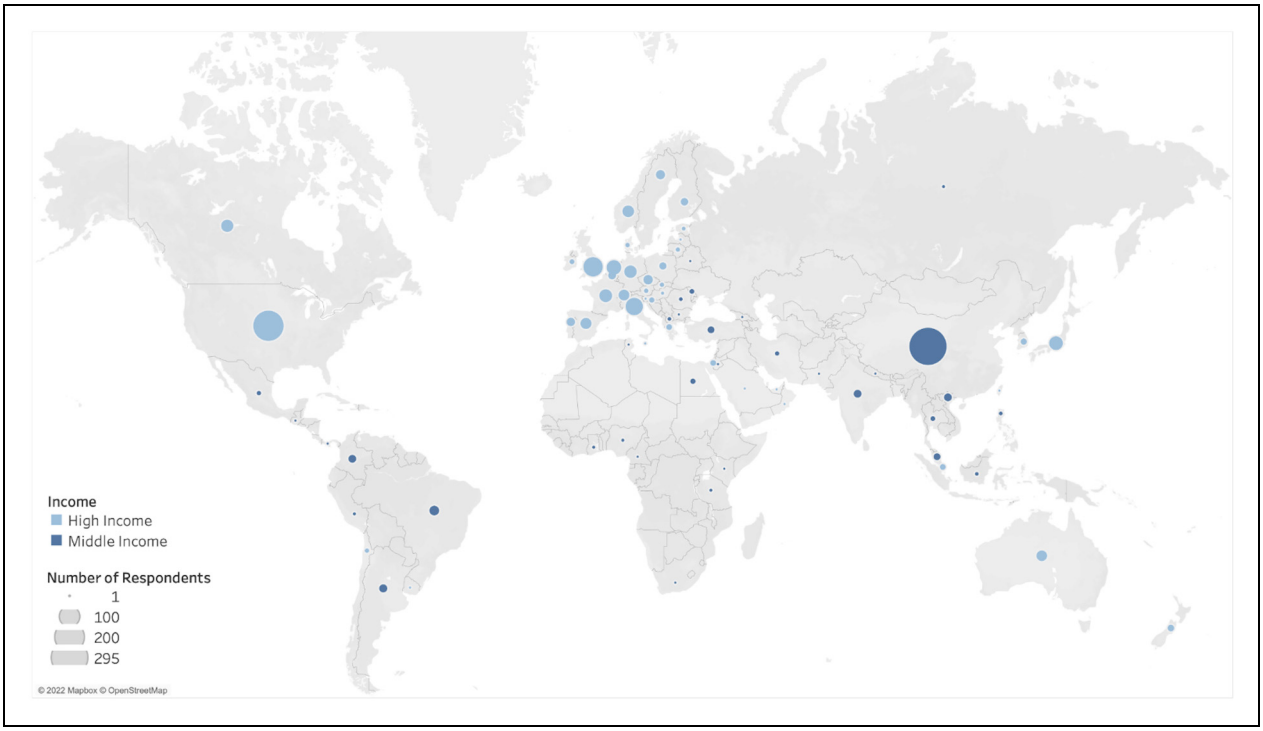

Figure 1. World map of respondents according to country income.

Table 1. Descriptive table of respondents.

Characteristic	Number (column %)		
	High income (n = 799)	Middle income (n = 446)	p
Years of practice, years			<0.01
0–10	381/799 (47.7)	291/446 (65.2)	
> 10	418/799 (52.3)	175/466 (34.8)	
Gender			<0.01
Male	578/799 (72.3)	356/446 (79.8)	
Female	221/779 (27.7)	90/446 (20.2)	
Specialty			<0.01
Noninterventionists	520/799(65.1)	182/446 (40.8)	
Interventionists	279/799 (34.9)	264/446 (59.2)	

computed tomography (CT) head and CT angiography (CTA) was required to aid in patient selection, respondents from MIC were more likely to select CT-based imaging techniques (CT perfusion or multiphase CT) than their HIC counterparts (39.7% vs. 15.2%, $p < 0.01$). The most commonly selected advanced imaging technique in HIC was magnetic resonance imaging (MRI) with diffusion-weighted imaging 59.3% vs. 34.2% in MIC ($p < 0.01$; Table 3).

Timing

Respondents from both groups were more likely to select time of deterioration consistent with BAO (MIC 62.3% vs. HIC 57.3%, $p = 0.09$), as opposed to time of first symptom as the time of onset in patient selection for EVT in BAO (Table 3).

In the early time window of < 6 h from estimated symptom onset of BAO, most respondents from both MIC and HIC agreed that EVT selection could forego advanced imaging (66.3% vs. 77.7%, $p < 0.01$). Across all other later time windows surveyed (between 6 and 12 h, between 12 and 24 h and between 24 and 48 h), respondents in MIC were more likely to choose advanced imaging to aid patient selection (MIC 67.2% vs. HIC 50.5%, MIC 78.8% vs. HIC 64.2%, MIC 66.3% vs. HIC 56.3%, respectively, all $p < 0.01$; Table 3).

Severity

Respondents from MIC were more likely to specify a National Institute of Health Stroke Scale (NIHSS) threshold to stratify patients with BAO stroke for selection to EVT (55.7% vs 41.8%, $p < 0.01$) whereas HIC respondents were willing to offer EVT to patients with confirmed BAO regardless of NIHSS (44.8% vs 38.8%, $p < 0.01$).

Respondents from MIC were less likely to offer a thrombectomy to patients with a pre-stroke modified Rankin Scale (pmRS) of ≤ 3 compared to HIC respondents (39.5% vs. 50.1%, $p < 0.01$), whereas with a pmRS of ≤ 2, this proportion was higher for MIC (54.8% vs 41.6%, $p < 0.01$; Table 3).

Clot location

In cases of occlusions of the first segment of the posterior cerebral artery respondents from MIC were less likely to indicate that they would favor proceeding to thrombectomy (53.5% vs 69.7%, $p < 0.01$; Table 3). However, they were

Table 2. Equipoise of basilar artery thrombectomy by income group.

Question	Number (column %)		
	High income	Middle income	p
EVT is superior to SMT* in certain situations			<0.01
Agree	782/798 (98.0)	419/445 (94.2)	
Disagree	2/798 (0.3)	5/445 (1.1)	
Neither agree nor disagree	14/798 (1.8)	21/445 (4.7)	
I believe further RCTs are warranted for EVT in BAO			<0.01
Agree	590/797 (74.0)	406/443 (91.6)	
Disagree	117/797 (14.7)	14/443 (3.2)	
Neither agree nor disagree	90/797 (11.3)	23/443 (5.2)	
Do the results of the BEST/BASICS trials make you more or less likely to offer EVT?			<0.01
Less likely	111/797 (13.9)	74/443 (16.7)	
More likely	93/797 (11.7)	94/443 (21.2)	
No change	593/797 (74.4)	275/443 (62.1)	
BAO thrombectomy			<0.01
Should be considered as a "rescue" option post-thrombolysis judged to have been unsuccessful	16/797 (2.0)	29/443 (6.5)	
Should be performed in patients with NIHSS $\geq$ 10	42/797 (5.3)	35/443 (7.9)	
Should be performed on a case-by-case basis	400/797 (50.2)	225/443 (50.8)	
Should be performed only with addition of advanced imaging†	61/797 (7.7)	83/443 (18.7)	
Should be performed with similar criteria to anterior circulation occlusion	217/797 (27.2)	57/443 (12.9)	
Should not be performed routinely outside of clinical trials	33/797 (4.1)	11/443 (2.5)	
Other	28/797 (3.5)	3/443 (0.7)	
I would find it acceptable to enroll the following patients with BAO in the standard medical treatment arm of a EVT RCT‡:			<0.01
NIHSS <10	100/766 (13.1)	26/407 (6.4)	
NIHSS > = 10	36/766 (4.7)	91/407 (22.4)	
Time of onset > 6 h	124/766 (16.2)	35/407 (8.6)	
All who met the criteria set out by the trial	295/766 (38.5)	239/407 (58.7)	
I would not be happy to enroll in the standard medical treatment arm of an RCT	266/766 (34.7)	61/407 (15.0)	
Other	41/766 (5.4)	5/407 (1.2)	

BAO: basilar artery occlusion; BASICS: Basilar Artery International Cooperation Study; BEST: Basilar Artery Occlusion Endovascular Intervention Versus Standard Medical Treatment; EVT: endovascular thrombectomy; NIHSS: National Institute of Health Stroke Scale; RCT: randomized controlled trial; SMT: standard medical treatment.

†Advanced imaging is defined as any intracranial imaging other than a non-contrast CT head and CT angiography.

more likely to consider patients with a V4 segment of the vertebral artery occlusion for EVT (47.5% vs 36.6%, $p < 0.01$; Table 3).

Procedure-related references

With regard to stenting or angioplasty, the majority of respondents from MIC (86.0%) and HIC (83.9%) advocated its use on a case-by-case basis ($p = 0.21$; Table 3). Respondents from MIC (90.9%) and HIC (93.1%) did not feel that whether a patient had received thrombolysis would alter their decision on whether to proceed with EVT ($p = 0.17$; Table 3).

Discussion

This international survey conducted after the BEST and BASICS trial results, but before the publication of the results of the ATTENTION and BAOCHE,[2,3] shows significant differences between physicians in HIC and MIC, both in their responses to areas of potential equipoise, as well as in the clinical and imaging parameters used to aid in patient selection.

In recent years many LMICs have increased their proportion of gross domestic product spending on science, technology, and innovation as a way of increasing external investment.[13] The globalization of clinical trials has improved, but overall participation of LMIC in research remains comparatively low.[10] In an area of clinical uncertainty, at the time of the survey, respondents from MIC were significantly more likely to agree that further RCTs were warranted for EVT in cases of BAO and significantly more likely than their HIC counterparts to enroll all patients who met the criteria specified by a trial in a BAO RCT. This was observed despite 94.4% of respondents reporting that they believed EVT was superior to SMT in certain situations, even though EVT in cases of BAO was lacking RCT evidence to support this position at the time.[20]

The results of this international survey open the possibilities of increasing involvement of MIC in areas where the high resources, expense, and administrative hurdles in larger systems often experienced in HIC can create barriers to conduct research studies. This is in addition to the many other potential benefits of undertaking research trials in LMICs. This may include decreased operational costs, increased research capacity, availability of

Table 3. Clinical and imaging parameters aiding selection by income group.

Question	Number (column %) High income	Middle income	p
Patients with a CTA source imaging pc-ASPECTS of greater than which of the below should proceed to thrombectomy, within your accepted time frames?			<0.01
> 5	81/787 (10.3)	16/430 (3.7)	
>6	77/787 (9.8)	89/430 (20.7)	
>7	53/787 (6.7)	43/430 (10.0)	
>8	21/787 (2.7)	25/430 (5.8)	
More advanced imaging[†] is required before proceeding to thrombectomy in all patients with basilar artery occlusion	125/787 (15.9)	90/430 (20.9)	
pc-ASPECTS should not be used to select patients	353/787 (44.9)	148/430 (34.4)	
Thrombectomy should not be routinely performed in any patients with basilar artery occlusions unless part of a randomized clinical trial	17/787 (2.2)	12/430 (2.8)	
Other	60/787 (7.6)	7/430 (1.6)	
In cases where you believe more advanced imaging[†] is required, due to time window or other considerations, which imaging technique do you feel should be used to aid in patient selection for basilar artery EVT?			<0.01
CT perfusion	98/786 (12.5)	92/430 (21.4)	
I do not believe advanced imagine is required	127/786 (16.2)	60/430 (14.0)	
MRI (DWI)	466/786 (59.3)	147/430 (34.2)	
MRI perfusion	42/786 (5.3)	39/430 (9.1)	
Multiphase CTA collateral score	21/786 (2.7)	79/430 (18.4)	
Thrombectomy should not be routinely performed on patients with basilar artery occlusions unless part of a randomized clinical trial	14/786 (1.8)	6/430 (1.4)	
Other	18/786 (2.3)	7/430 (1.6)	
In my clinical practice in patients with confirmed BAO:			0.09
I take time of onset from acute symptoms believed to be due to basilar artery occlusion, even if these symptoms are preceded by stroke-like symptoms not in keeping with basilar artery occlusion	445/776 (57.3)	263/422 (62.3)	
I take time of onset from the first symptoms of stroke, regardless of severity.	331/776 (42.7)	159/422 (37.7)	
In patients with BAO on CTA presenting within 6 h of onset:			<0.01
Advanced imaging[†] selection should be required in selection of patients for EVT	89/776 (11.5)	96/421 (22.8)	
EVT should occur without need for advanced imaging.	603/776 (77.7)	279/421 (66.3)	
EVT should only be considered as part of a randomized clinical trial.	28/776 (3.6)	39/421 (9.3)	
Other (with free-text specification required)	56/776 (7.2)	7/421 (1.7)	
In patients with BAO on CTA presenting between 6 and 12 h postsymptom onset:			<0.01
Advanced imaging[†] selection should be required in selection of patients for EVT	391/776 (50.5)	283/421 (67.2)	
EVT should occur without need for advanced imaging.	250/776 (32.2)	106/421 (25.2)	
EVT should only be considered as part of a randomized clinical trial.	63/776 (8.1)	27/421 (6.4)	
Other (with free-text specification required)	72/776 (9.3)	5 (1.2)	
In patients BAO on CTA presenting between 12 and 24 h postsymptom onset:			<0.01
Advanced imaging[†] selection should be required in selection of patients for EVT	497/774 (64.2)	331/420 (78.8)	
EVT should occur without need for advanced imaging.	111/774 (14.3)	42/420 (10.0)	
EVT should only be considered as part of a randomized clinical trial.	98/774 (12.7)	41/420 (9.8)	
Other (with free-text specification required)	68/774 (8.8)	6/420 (1.4)	

(continued)

Table 3. Continued.

Question	Number (column %) High income	Middle income	p
In patients with BAO on CTA presenting between 24 and 48 h postsymptom onset:			<0.01
Advanced imaging† selection should be required in selection of patients for EVT	437/776 (56.3)	279/421 (66.3)	
EVT should occur without need for advanced imaging.	36/776 (4.6)	11/421 (2.6)	
EVT should only be considered as part of a randomized clinical trial.	243/776 (31.3)	114/421 (27.1)	
Other (with free-text specification required)	60/776 (7.7)	18/421 (4.3)	
Regarding NIHSS score in patients with a confirmed BAO, within my accepted time frames and imaging requirements:			<0.01
A minimum of NIHSS $\geq$ 6 should be used.	250/772 (32.4)	123/418 (29.4)	
A minimum of NIHSS $\geq$ 10 should be used.	67/772 (8.7)	101/418 (24.2)	
Only patients with a NIHSS <6 should proceed to EVT	6/772 (0.8)	9/418 (2.2)	
EVT should be offered to patients with a confirmed BAO, regardless of NIHSS	346/772 (44.8)	162/418 (38.8)	
EVT should not be routinely performed on patients with basilar artery occlusions unless part of a RCT.	22/772 (2.8)	12/418 (2.9)	
Other	81/772 (10.5)	11/418 (2.6)	
Regarding premorbid mRS score and patients with a confirmed BAO, within my accepted time frames, imaging requirements and stroke severity:			<0.01
EVT should be offered to patients with premorbid modified rankin scale (MRS) $\leq$ 2,	321/772 (41.6)	229/418 (54.8)	
EVT should be offered to patients with premorbid MRS $\leq$ 3,	387/772 (50.1)	165/418 (39.5)	
EVT should not be routinely performed unless part of a RCT	28/772 (3.6)	16/418 (3.8)	
Other	36/772 (4.7)	8/418 (1.9)	
In my opinion, with regards to the site of posterior circulation occlusion and EVT, within your accepted time frame:			<0.01
Thrombectomy should be considered on patients with the V4 segment of the vertebral artery (intradural/intracranial), proximal, middle, or distal basilar occlusions and posterior cerebral artery.	282/771 (36.6)	196/413 (47.5)	
Thrombectomy should be performed on patients with middle or distal basilar occlusions.	47/771 (6.1)	36/413 (8.7)	
Thrombectomy should be performed with proximal, middle, or distal basilar occlusions.	373/771 (48.4)	163/413 (39.5)	
Thrombectomy should not be routinely performed on patients with basilar artery occlusions unless part of a randomized clinical trial, regardless of location.	31/771 (4.0)	15/413 (3.6)	
Other	38/771 (4.9)	3/413 (0.7)	
For an isolated P1 occlusion I would consider proceeding to thrombectomy, within my accepted time frames:			<0.01
Agreement	537/771 (69.7)	221/413 (53.5)	
Disagreement	89/771 (11.5)	64/413 (15.5)	
Neither agree nor disagree	145/771 (18.8)	128/413 (31.0)	
In my opinion, with regards to stenting or angioplasty in patients with BAOs patients who are noted to have an underlying atheromatous lesion felt to be significant:			0.10
I would consider stenting or angioplasty sometimes appropriate at the discretion of the neurointerventionalists on a case-by-case basis.	643/766 (83.9)	350/407 (86.0)	
Stenting or angioplasty should not be considered in basilar artery thrombectomy.	75/766 (9.8)	43/407 (10.6)	
Thrombectomy should not be routinely performed on patients with basilar artery occlusions unless part of a randomized clinical trial.	31/766 (4.0)	12/407 (2.9)	
Other	17/766 (2.2)	2/407 (0.5)	

(continued)

Table 3. Continued.

Question	Number (column %)		
	High income	Middle income	p
With regard to patients who have had IV thrombolysis with known BAO:			<0.01
In my opinion, patients with BAO who have received thrombolysis should not proceed to thrombectomy unless part of a randomized clinical trial.	13/765 (1.7)	22/407 (5.4)	
Thrombectomy should not be routinely performed on patients with BAO unless part of a randomized clinical trial, irrespective of whether they are eligible for thrombolysis.	17/765 (2.2)	13/407 (3.2)	
Thrombolysis would not influence my decision on whether to proceed to thrombectomy in patients with BAO	712/765 (93.1)	370/407 (90.9)	
Other	23/765 (3.0)	2/407 (0.5)	

*Estimated time of BAO is defined as the onset of acute symptoms leading to the clinical diagnosis of BAO or, if unknown, the time the patient was last seen normal before stroke symptom onset.
†Advanced imaging is defined as any intracranial imaging other than a noncontrast CT head and CT angiography.
‡Respondents were able to select more than one answer for this question.
BAO: basilar artery occlusion; CTA: computed tomography angiography; DWI: diffusion-weighted imaging; EVT: endovascular thrombectomy; MRI: magnetic resonance imaging; mRS: modified Rankin scale; NIHSS: National Institute of Health Stroke Scale; pc-ASPECTS: posterior circulation Acute Stroke Prognosis Early Computed Tomography Score; RCT: randomized controlled trial.

treatment naïve patients for recruitment, opportunity for participants to access otherwise unavailable treatments[12,21] and a decrease in migration of LMIC researchers to HICs, the so-called "brain drain."[14]

Further expenditure and increased contribution from HICs to official development assistance may be required to drive research growth in LMIC.[16] The symbiotic nature of a research relationship between HIC and LMIC means it is vital that research funding flowing from HIC to LMIC is not cut when pressures on budgets arise.[14] This study highlights the potential benefit to all countries when MIC are included in research studies.

Reasons for the increased willingness to enroll in RCTs in MIC is likely multifactorial but our survey points to access to resources as an important component. Respondents from MIC were significantly more likely to choose CT-based imaging rather than MRI to guide their clinical decision making in BAO than respondents from HIC.[22,23] This selection paradigm is further reinforced by the recent positive BAO trials, ATTENTION and BAOCHE, performed in China, which allowed enrollment based on standard and widely available CT imaging.[2,3] These findings highlight the importance of research infrastructure and broadening of thrombectomy trial eligibility considerations to improve enrollment of patients from MIC, to improve the generalizability of thrombectomy trial data results not only to patients in HIC or MIC but also to those from LIC.[24] Respondents from MIC were also more likely to favor a stricter mRS cut-off score of <3 than their HIC counterparts in patient selection. MIC respondents were also more likely to use scoring systems, both NIHSS and pc-ASPECTS, to aid patient selection for enrollment. This result may reflect that physicians from MIC, based on available resources, select patients more likely to have better clinical outcomes at the functional and societal level. In patients presenting with isolated P1 occlusions, respondents from MIC were less likely to proceed to thrombectomy compared to those from HIC, underscoring uncertainty in benefit of EVT in patients with medium vessel occlusion of the posterior circulation.[25–27]

Our study highlights the potential to improve the quality and recruitment of patients to RCTs by increasing participation from MIC. The fact that we had no respondents from LIC is either a reflection of the challenges we faced in recruiting such participants to participate in BAO surveys or a reflection of their limited resources to care for patients with BAO. As we suspect the latter, this disparity highlights the need to improve access to EVT for patients in LIC and MIC,[28] in light of the evolution of anterior LVO and now BAO trial data.

Limitations

This survey captured the opinions of a large and diverse number of physicians involved in stroke care; however as with all surveys, the results should be interpreted with caution. While this survey reflects the reported beliefs of practicing physicians across the globe, these beliefs do not reflect the correct course of action in clinical practice.

As the survey was distributed via national and international organizations involved in stroke care, it may be limited by sampling bias reflective of the participation of physicians involved in such organizations and those who are fluent in English or Chinese.

The survey was conducted before the preliminary results of the ATTENTION and BAOCHE BAO trials were presented at the European Stroke Organization Congress in May 2022. Although the result of these trials would likely have influenced respondents' answers, in this prespecified analysis looking at differences between MIC and HIC respondents with respect to treatment preference, our study highlights the difference of approach to areas of clinical equipoise between these two country-income strata.

Conclusions

While most physicians globally were in agreement that, in certain circumstances, EVT is superior to SMT at the time of the survey, respondents from MIC were more likely to perceive that further trials were warranted and more likely to express willingness to enroll eligible patients in a BAO RCT than their HIC counterparts.

This difference in approach to an area where clinical equipoise has been called into question without supporting RCT evidence highlights the potential for greater contribution from a wider range of MICs to new research trials.

Abbreviations

ATTENTION	Endovascular Treatment for Acute Basilar Artery Occlusion: A multicenter randomized controlled trial
BAO	Basilar artery occlusion
BAOCHE	Basilar Artery Occlusion Chinese Endovascular
BASICS	Basilar Artery International Cooperation Study
BEST	Basilar Artery Occlusion Endovascular Intervention Versus Standard Medical Treatment
EVT	Endovascular therapy
HICs	High-income countries
LMICs	Low and middle-income countries
LVO	Large vessel occlusion
MICs	Middle-income countries
mRS	modified Rankin scale
NIHSS	National Institute of Health Stroke Scale
pc-ASPECTS	Posterior circulation Acute Stroke Prognosis Early Computed Tomography Score
RCT	randomized clinical trial

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