Question 12 evidence tables

Question 12: For patients with ischaemic stroke and large vessel occlusion, does thrombectomy performed under general anaesthesia improve outcome compared to local anaesthesia and/or conscious sedation?

NB Any discrepancies between reviewers in evidence quality and comment were discussed at the corresponding evidence review meeting

SR = systematic review, MA = meta-analysis, RCT = randomised controlled trial, IPDMA = individual patient data meta-analysis, MDT = multidisciplinary team, PICO = patient/population, intervention, comparison and outcomes, OR = odds ratio, CI = confidence interval, QoL = quality of life, ADL = activities of daily living, OR = odds ratio, RR = relative risk, aOR = adjusted odds ratio, cOR = crude odds ratio, CI = confidence interval, RoB = risk of bias, I2 = heterogeneity statistic.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
110	X. Bai et al. (2021). General anesthesia versus conscious sedation for endovascular therapy in acute ischemic stroke: A systematic review and meta-analysis. *Journal of Clinical Neuroscience,* 86: Oct-17	Systematic review and meta-analysis of 5 RCTs (SIESTA, AnStroke, GOLIATH, CANVAS pilot, Ren et al)	Conscious sedation compared with GA	Primary: mRS 0-2 at 3 months Secondary: mTICI 2b-3 Complications (interventional and medical) SICH Anaesthesia-related complications Mortality at 3 months Brain infarction on CT or MRI Vasoactive drug use	5 RCTs included. Compared to conscious sedation, GA was associated with increased functional independence (mRS 0-2 RR 1.28 [1.05-1.55], p= 0.013], successful recanalization (RR 1.13 [1.04-1.23] p=0.004), pneumonia (RR [1.97-1.18] p=0.01) , MAP decrease (RR 1.71 [1.19-2.47], p<0.001) and vasoactive drug use (RR 1.26 [1.01-1.56], p=0.037)	++
110	X. Bai et al. (2021). General anesthesia versus conscious sedation for endovascular therapy in acute ischemic stroke: A systematic review and meta-analysis. *Journal of*	Meta-analysis of 5 eligible studies (all RCTs) where data could be extracted to compare LA with conscious sedation for MT.	Patients eligible for MT treated with GA or CS as intended anaesthetic type.	Clinical (MRS <2) and imaging (TICI 2b-3) outcomes, complications including ICH and pneumonia where recorded.	GA superior outcomes GA vs CS: MRS 0-2 50% vs 41% CS; recan 87% vs 77% and SICH 3% vs 6% respectively. Higher rates of pneumonia and 20% MAP decrease in GA group.	+ Few studies eligible for analysis.

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	Clinical Neuroscience, 86: Oct-17					
111	F. Benvegnu et al. (2020). Local Anesthesia without Sedation during Thrombectomy for Anterior Circulation Stroke Is Associated with Worse Outcome. *Stroke,* : 2951-2959	Prospective observational registry study from 4 centres in France. All endovascular cases included in registry. 1034 participants, 762 conscious sedation v 272 local anaesthesia; after exclusions and propensity score matching 222 pairs in ITT and 167 in per-protocol analyses.	Conscious sedation with IV remifentanil + local xylocaine (policy at 3 centres) v xylocaine alone (1 centre policy).	Primary: mRS 0-2 at day 90 F2F or telephone. Secondary: mRS 0-1 at day 90; early neurological improvement NIHSS decreas >=4 or =0 or 1 at 24h); 24h delta NIHSS; mTICI 2b-3; mortality; prpcedural complications; ICH. Propensity score matching.	mRS 0-2 less likely with LA (relative risk=0.76 [95% CI, 0.60–0.97]). mTICI 2b-3 less likely with LA (relative risk=0.88 [95% CI, 0.79–0.98]). Other endpoints did not differ.	Confounding partially addressed by propensity score matching but it remains a comparison of one centre behaviour versus 3 other centres.
111	F. Benvegnu et al. (2020). Local Anesthesia without Sedation during Thrombectomy for Anterior Circulation Stroke Is Associated with Worse Outcome. Stroke, : 2951-2959	Prospective multicentre observational registry comparing LA and CS. Intention-to-treat and per-protocol analyses. Propensity score matching method and Inverse probability of treatment weighting method. Patients treated between January 1, 2018, and December 31, 2018 included.	LA vs CS. 762 were included in the conscious sedation group and 272 were included in the LA group.	Favourable outcome (90-day modified Rankin Scale score 0–2) Rate of successful reperfusion (modified Thrombolysis in Cerebral Infarction grade 2b–3. Procedure time. NIHSS improvement from baseline to 24 hours	Favourable outcome significantly lower in the LA group than in the conscious sedation group (40.0% versus 52.0%). Rate of successful reperfusion (modified Thrombolysis in Cerebral Infarction grade 2b–3; 76.6% versus 87.1% significantly lower in the LA group	Acceptable. Nonrandomized design. Significant difference in group size before matching. Grouping based on centre protocol.
112	W. Butt et al. (2021). Local anesthesia as a distinct comparator versus conscious sedation and general anesthesia in	Systematic review and meta-analysis. 7797 patients.	LA versus CS and LA versus GA comparisons.	The primary outcome was 90 day good functional outcome (modified Rankin Scale (mRS) score of ≤2).	There was no significant difference in the outcomes.	High quality. It was not possible with this data set to decide which mode of anaesthesia was associated with a better outcome.

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	endovascular stroke treatment: A systematic review and meta-analysis. *Journal of NeuroInterventional Surgery,* : neurintsurg-2021-017360	(2797 LA, 2218 CS, and 2782 GA) were identified.				
112	W. Butt et al. (2021). Local anesthesia as a distinct comparator versus conscious sedation and general anesthesia in endovascular stroke treatment: A systematic review and meta-analysis. *Journal of NeuroInterventional Surgery,* : neurintsurg-2021-017360	Systematic Review and Meta-Analysis along (PRISMA) guidelines for MT patients comparing LA with CS or LA compared with GA. Studies from 2010-2020 included. (Six studies were prospective and two were retrospective cohort studies).	LA compared with CS or LA compared with GA.	Primary: good functional outcome (mRS ≤2) at 90 days. Secondary clinical: were excellent functional outcome (mRS ≤1), mortality, and sICH. Secondary procedural outcomes: successful reperfusion (TICI ≥2b), the first pass effect, procedure related complications, door to groin puncture time, groin puncture to reperfusion time.	921 titles and abstracts screened. 20 full texts analysed. Data were extracted from eight studies. Patients: 2797 LA v 2218 CS v 2782 GA. LA versus GA: No statistically significant. Difference (functional outcome or mortality). LA versus CS: No statistically significant. Difference (functional outcome or mortality). Tendency to excellent outcome (mRS ≤1) in the LA group v the GA group. Tendency towards higher odds of death at 90 days in the GA versus the LA group.	Acceptable. Limited by baseline study quality and ability to compare presenting stroke severity.
113	B. C. V. Campbell et al. (2018). Effect of general anaesthesia on functional outcome in patients with anterior circulation ischaemic	MA of individual patient-level data pooled from randomised trials listed in Pubmed 1/Jan/2010-31/May/2017 comparing endovascular thrombectomy.	Patients treated under GA (sedation with intubation) (n = 236) and patients treated with non-GA patients (managed with or	Primary outcome: mRS at 3 months analysed using ordinal logistic regression to obtain common odds ratio (cOR).	Significant benefit of endovascular treatment in primary outcome for both GA and non-GA groups compared to no thrombectomy.	++ Good quality study although authors note that findings in three small RCT not included in this analysis and investigating

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	stroke having endovascular thrombectomy versus standard care: a meta-analysis of individual patient data. *The Lancet Neurology,* 17:1 47-53	(performed predominantly using predominantly stent-retrievers) with standard care in anterior circulation ischaemic stroke patients (HERMES Collaboration) n= 797 stroke patients with hyperacute ischaemic stroke associated with anterior circulation large vessel occlusion and good pre-morbid function from 7 RCT.	without sedation and not intubated) (n = 563) were compared to standard of care (no thrombectomy) (n = 893) with adjustment for baseline prognostic factors and mixed-effects modelling to account for between trials variance and inclusion of propensity scores for GA versus non-GA.	Secondary outcomes: Proportion of patients (i) reaching independence (mRS 0-2), (ii) with return to all usual activities (mRS 0-1), (iii) with early neurological recovery defined as a ≥8 point reduction in National Institutes of Health Stroke Scale (NIHSS) or reaching 0-1 at 24 hours. Safety outcomes: (i) proportion of patients who had died at 90 days, (ii) the proportion with symptomatic intracerebral haemorrhage (SICH, as defined by each trial), (iii) the proportion with parenchymal haematoma (PH, intracerebral blood clot with mass effect), (iv) proportion with post-procedure pneumonia and (v) proportion with vessel perforation.	Significant benefit in primary outcome using non-GA versus GA.\n\nNo significant safety effects GA v non-GA\nNo significant difference between groups in time from onset to reperfusion but shorter time interval between randomisation and reperfusion for non-GA v GA	GA v conscious sedation there were formalised protocols for anaesthetic agent use, BP management and correction of hypo/hyper ventilation all of which were not standardised in the included RCT. There was also a shorter time to induction with GA in these three studies and no signal to benefit in outcomes for conscious sedation v GA.
113	B. C. V. Campbell et al. (2018). Effect of general anaesthesia on functional outcome in patients with anterior circulation ischaemic stroke having endovascular thrombectomy versus standard care: a meta-	MA of individual pooled patient data from 7 multicentre international RCTs (HERMES collaboration) comparing MT + standard medical treatment with standard medical treatment alone in patients with anterior circulation stroke. Pooled data 1764 patients, 871 MT, 893 standard medical care.	Comparison of thrombectomy group who underwent GA, versus non GA patients (conscious sedation or no sedation). Further comparison with control non MT	Primary outcome: mRS at 3 months Secondary outcomes: proportion of mRS 0-2, mRS 0-1, early neurological recovery Safety outcomes: mortality at 90 d, symptomatic ICH, parenchymal haematoma.	Primary outcome: Logistic regression, odds of improved functional outcome significantly greater in non-GA versus GA group after adjustment for baseline prognostic factors (cOR 1.53, CI95 1.14-2.04, p=0.004). Propensity-stratified analysis generated similar results.	++\n\nCorrelating to the SIGN methodology checklist, the methodology of this meta-analysis not very detailed in the paper, however, it is individual pooled patient data from HERMES collaboration, and a detailed methodology is

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	analysis of individual patient data. *The Lancet Neurology,* 17:147-53		standard medical treatment only group. 30% of MT patients were treated under GA. At baseline GA patients were younger and had shorter time from stroke onset to randomization than non GA.	Also compared proportion of patients with pneumonia and vessel perforation	Secondary outcomes: odds of achieving functional independence, excellent functional outcome, early neurological improvement significantly greater in non-GA than GA group. No significant difference between non-GA versus GA groups in safety outcomes, or pneumonia and vessel perforation rates. MT patients treated under GA still had greater odds of improved outcome than the control medical treatment only group.	provided in the original HERMES publication. The results of this study are directly applicable to the patient group targeted by this guideline. The study is not however a meta-analysis of RCTs directly addressing the PICO question. There is a limitation as the choice to use GA vs non-GA, and differentiation between medically required GA vs elective GA was not recorded in the included trial databases. Despite adjustment for baseline imbalances between patients it is therefore possible confounders remain.
114	M. Cappellari et al. (2020). General Anesthesia Versus Conscious Sedation and Local Anesthesia during Thrombectomy for Acute Ischemic Stroke. *Stroke,* : 2036-2044	Cohort study on prospectively collected data of patients enrolled in the IRETAS (Italian Registry of Endovascular Treatment in Acute Stroke) between January 2011 and December 2017. Adults > 18 receiving thrombectomy for hyperacute stroke associated with large vessel occlusion (anterior or posterior circulation).	4429 patients (n=2013, GA; n=1285 CS, n = 1131 LA) were included. GA group included (n=1881, GA started before procedure; n=132, GA started during procedure after conversion from CS or LA), GA = general anaesthetic CS = conscious sedation LA = local anaesthesia	Functional outcomes were: (1) excellent functional outcome (modified Rankin Scale score of 0–1), (2) favourable functional outcome (modified Rankin Scale score of 0–2), and (3) death at 3 months. Radiological outcomes were (1) successful recanalization (Thrombolysis in Cerebral Infarction grading system 2b/3), (2) complete recanalization (Thrombolysis in Cerebral Infarction grading system	GA (versus non-GA) during mechanical thrombectomy was significantly associated with lower rates of excellent and favorable functional outcome, any ICH, HI, and PH after adjustment for unbalanced variables and models of propensity score matching including predefined predictors; however, the rate of sICH was similar between the groups. GA (versus CS) was associated with lower rates of any ICH and PH but similar sICH after adjustment for unbalanced variables and predefined	+ Large patient population studied but a number of limitations noted to findings including retrospective dataset and no randomisation to anaesthesia type, missing outcome data and predefined predictors, incomplete information on choice of GA and GA protocols and reasons for conversion from LA/CS to GA.

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				3) after the procedure, (3) any type of intracerebral hemorrhage (ICH), (4) hemorrhagic infarct (HI), (5) parenchymal hematoma (PH), (6) subarachnoid hemorrhage, and (7) sICH (defined as PH with increase of ≥4 National Institutes of Health Stroke Scale score points from baseline or death) within 24 hours. Two main analyses performed: (1) comparison across GA v CA and GA v LAS with adjustment for unbalanced variables and (2) comparison across 5 models of propensity score matching using combinations of predefined clinical and radiological predictors.	predictors and lower rate of HI with similar sICH and favourable outcome in several of the models with predefined variable adjustment GA (versus LA) was associated with lower rates of excellent and favourable outcome and any ICH, HI and PH after adjustment of unbalanced variables with similar sICH and in most models with pre-defined variables showed that GA was associated with higher rate of death.	
114	M. Cappellari et al. (2020). General Anesthesia Versus Conscious Sedation and Local Anesthesia during Thrombectomy for Acute Ischemic Stroke. *Stroke,* : 2036-2044	Prospective cohort study of 4429 patients entered into Italian registry of Stroke Interventions between 2011-2017.	MT under any GA, CS or LA where stated.	3 month MRS and ICH.	Good outcomes 32.7% GA vs 35.8% non-GA; favourable functional outcome 42.5% vs 49.4%; 3/12 MRS 0-1 32.7%, 33.7%, 38.1% GA CS and LA respectively. 3/12 mortality 21.5% 19.7%14.8% GA, CS and LA. any ICH higher in GA group	+ Cohort study but good numbers allowed correction for many variables.

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115	O. F. Eker et al. (2018). Impact of anesthetic management on safety and outcomes following mechanical thrombectomy for ischemic stroke in SWIFT PRIME cohort. *Frontiers in Neurology,* 9:AUG 702	Post-hoc subgroup analysis of SWIFT-Prime RCT including 98 participants randomised to the endovascular treatment arm	Centres with conscious sedation v GA policies; secondary analyses grouped by anaesthetic delivered rather than site policy	Rates of successful recanalization, procedural complications, and clinical outcomes at 90 days.	32 participants at GA-policy sites v 65 at conscious sedation -policy sites. 1 subject exclude (no procedure). Crossovers (GA undertaken in 7/65 CS patients and CS in 3/32 GA patients). No difference in TICI 2b-3 recanalisation, mRS at day 90. Higher incidence of pneumonia with GA-policy (OR 4.25, p=0.03) and lower rate of mRS 0-2 at day 90 (OR 0.32; p=0.05).	- (Does not fit SIGN methodology algorithm.)
115	O. F. Eker et al. (2018). Impact of anesthetic management on safety and outcomes following mechanical thrombectomy for ischemic stroke in SWIFT PRIME cohort. *Frontiers in Neurology,* 9:AUG 702	Post hoc analysis of data from the interventional arm of the RCT SWIFT PRIME (Solitaire FR MT + IVT vs IVT alone in Ant Circ LVO patients). 97 MT patients analysed. Primary analysis compared pts treated at GA policy hospitals, versus conscious sedation (CS) policy hospitals. Due to potential for conversion to GA or CS, a secondary analysis compared all pts who actually received GA to those who received CS Third analysis compared patients who received GA in GA policy hospital and those who received GA in CS policy hospital Fourth analysis assessing interaction of anaesthetic management with treatment	Comparison of baseline variables, time metrics, procedural and clinical outcomes in MT patients from SWIFT PRIME treated under GA or CS as through 4 different analysis strategies. Total of 36 patients received GA (7 were performed in CS policy centres, i.e. conversion). Total of 61 patients received CS (3 were performed in CS policy centres). In GA policy group patients were significantly older and	Primary outcome: Time to treatment initiation (TTI), TICI 2b/3, mRS 0-2 at 90d Secondary outcomes: adverse events, rates of non-standard anaesthetic management with respect to local policy, lowest systolic (LSBP) and diastolic (LDBP) blood pressure during MT	No statistically significant difference in 90 d functional independence between CS policy group (66.2%) vs GA policy group (50%) (p0.18) No significant difference between GA vs CS policy groups in TTI, rate of TICI 2b/3, haemorrhage, vessel dissection, or mortality. Higher rate of pneumonia with GA policy group (34.4% vs 12.3%, p=0.02) LSBP and LDBP lower in GA policy group (p=0.03, p=0.001). In a logistic regression model correcting for baseline variables, GA was an independent predictor of lower rate of 90 day functional	This is a post hoc analysis of prospectively collected data from a RCT designed to answer a different question. The original RCT was a high quality study. The results of this study are directly applicable to the patient group targeted by this guideline. The study is not however an RCT designed to directly address the PICO question, i.e. patients were not randomized by anaesthetic management type. Comparing GA and CS groups is subject to strong confounding by indication bias, the study tried to mitigate this by utilizing different analyses.

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		effect performed using data from SWIFT PRIME control goup.	greater proportion had hypertension. Other baseline characteristics comparable.		independence (OR 0.32, 95%CI 0.10-0.98, p=0.05). Independent of anaesthetic management, an increase in LDBP was an independent predictor of functional independence (OR 1.51 per 10 mm HG difference, p=0.01). When analysed by actually delivered anaesthetic method results of univariate and multivariate analysis were similar with 2 exceptions: no longer significant mean age difference between groups, no longer significant difference in rate of pneumonia between groups.	
116	R.-J. B. Goldhoorn et al. (2020). Anesthetic management during endovascular treatment of acute ischemic stroke in the MR CLEAN Registry. *Neurology,* 94:1 e97-e106	Patient series derived from a larger dataset. 1,376 patients were included.	Performed anaesthetic technique was LA in 821 (60%),GA in 381 (28%), and CS in 174 (13%) patients.	Primary outcome was the modified Rankin Scale score at 90 days.	Compared to LA, both GA and CS were associated with worse functional outcome on the modified Rankin Scale score at 90 days (GA cORadj 0.75; CS cORadj 0.45; CS was associated with worse functional outcome than GA (cORadj 0.60; 95% CI 0.42–0.87).	For the purposes of the guidelines, this was an average study. There was significant variation in the ages of the group as well as prestroke mRS.
116	R.-J. B. Goldhoorn et al. (2020). Anesthetic management during endovascular treatment of acute ischemic stroke in the MR CLEAN Registry.	Analysis of MRCLEAN data in 1376 patients where anaesthetic type stated. Patients were not randomised by anaesthesia type and this is therefore a retrospective cohort study of MRCLEAN registry data.	All patients eligible for MT where method of anaesthesia was stated.	MRS at 90 days. Additional outcome measures: NIHSS, successful reperfusion, SICH, stroke progression, pneumonia,	Both CS and GA had worse outcomes: 90 day MRS OR 0.75 for GA; CS 0.45. However, GA yielded higher reperfusion rates: 64% vs 59% LA, 52% CS. SICH similar in all groups.	+ Self-declared class III.

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	Neurology, 94:1 e97-e106					
117	A. P. Jadhav et al. (2017). Monitored Anesthesia Care vs Intubation for Vertebrobasilar Stroke Endovascular Therapy. *JAMA neurology,* 74:6 704-709	Retrospective, matched, case-control study of consecutive vertebrobasilar occlusion strokes treated with endovascular therapy. 61 pairs of patients (n = 122) underwent primary analysis	Monitored anaesthesia care (MAC) and general anaesthesia (GA) in patients presenting with vertebrobasilar occlusion	The primary outcome measure was the shift in the degree of disability among the 2 groups as measured by the modified Rankin scale at 90 days.	No difference in outcome.	For the purposes of the guidelines, this was an average study. There is a lot of controversy about whether basilar thrombectomy is supported by sufficient evidence in the first place.
117	A. P. Jadhav et al. (2017). Monitored Anesthesia Care vs Intubation for Vertebrobasilar Stroke Endovascular Therapy. *JAMA neurology,* 74:6 704-709	Retrospective matched case control study comparing monitored anaesthesia care (MAC) versus general anaesthetic/intubation (GA) in consecutive vertebrobasilar stroke patients treated with endovascular therapy (EVT). Study location: two University affiliated hospitals in USA. Patients selected from prospectively collected databases, treated between 2005 and 2015 in one institution, and between 2010 and 2015 in the other. 215 patients with vertebrobasilar occlusion treated during study period. 39 excluded as required emergent intubation prior to arrival at angiosuite. 63 patients (35.8%) had MAC, 113 (64.2%) elective GA. Conversion rate from MAC to GA 13% (n=8)	Stratified patients into two groups: those treated by EVT under MAC vs GA. All MAC patients had sedation. All MAC patients had anaesthetic monitoring.	Primary outcome: Shift in degree of disability among matched anaesthesia groups measured by mRS at 90 days Secondary outcomes: TICI 2b/3, mRS 0-2 at 90 days, Safety end points: 90 day mortality, rates of parenchymal haematoma (PH) Conversion patients were analysed with MAC group.	63 matched pairs with well matched baseline variables. Primary outcome: On shift analysis, no significant difference in overall distribution of day 90 mRS between groups Secondary and safety outcomes: no significant differences between groups in rate of TICI 2b/3, PH, wire perforations, mRS 0-2 at 90 days. Multivariate conditional logistic regression confirmed neither GA nor MAC associated with good outcome.	++ The results of this study are directly applicable to the patient group targeted by this guideline. The study was however confined to patients with vertebrobasilar occlusion, and did not include anterior circulation strokes.

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		Two groups were matched into patient pairs using algorithm based on baseline NIHSS, age, pretreatment glucose levels				
118	C. Kupper et al. (2021). General anesthesia versus conscious sedation in mechanical thrombectomy. *Journal of Stroke,* 23:1 103-112	German Stroke Registry 2015 2019	GA vs CS .6635 participants 67% GA 24.9% CS	CS vs GA has advantages in less complications, shorter time intervals and better functional outcome	CS better outcome 42.1% vs 34.2% Multivariate analysis worse for GA	++
118	C. Kupper et al. (2021). General anesthesia versus conscious sedation in mechanical thrombectomy. *Journal of Stroke,* 23:1 103-112	Cohort study of very large German registry of 6635 patients.	GA vs CS (not true LA group).	24 hour NIHSS, 3/12 good outcome, technical complications, ICH	GA vs CS: 10 minute longer delay to groin puncture from admission; 1.58 OR of procedural complication; hospital stay shorter in CS group 9.5 vs 11.3 days; 24 hour NIHSS 8 vs 11 CS vs GA; 3/12 good outcome 42.1% vs 33.5% CS vs GA. Lower mortality 23.4% CS vs 32.4% GA	+ Not RCT but by far the largest of all the studies but hampered by heterogeneity of study population.
119	F. Li et al. (2021). Impact of anesthetic strategy on outcomes for patients with acute basilar artery occlusion undergoing mechanical thrombectomy. *Journal of neurointerventional surgery,* :	Retrospective analysis of registry data for MT in BAO within 24 hrs, 47 centres in China, 2014-2019, n=639.	MT for BAO within 24 hours Primary question – association between choice of anaesthetic and clinical outcomes.	NIHSS Stroke mechanism mRS 90 days -excellent (0-1), independent (0-2), favorable (0-3) mTICI sICH haemorrhagic transformation 3 groups – GA, LA, CS	Demographics – sig diff in GA rates (age, stroke, CHD, NIHSS, timings) mRS outcome –no sig diff between 3 groups, stat sign diff in mRS with CS vs LA/GA median mRS range (p = 0.019) mTICI stat sig lower rates for LA vs GA/CS (0.028) stat sig diff in mortality in 3 groups (p=0.019)	- Whilst large patient cohort for BAO it is a retrospective analysis of an observational study with patient selection bias, no standardised protocols, stat diff demographics of GA group impacting results Nevertheless it shows no stat sig diff in outcomes or haemorrhage rate, mortality

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					Higher in GA and LA vs CS. Haemorrhage – no stat sig diff.	outcome may be impacted by baseline demographics
119	F. Li et al. (2021). Impact of anesthetic strategy on outcomes for patients with acute basilar artery occlusion undergoing mechanical thrombectomy. *Journal of neurointerventional surgery,* :	A Meta-Analysis of Randomized Controlled Trials comparing the results of mechanical thrombectomy with or without prior thrombolysis	Direct to MT vs IVTPA plus MT	Primary: mRS 0-2 at 90 days Secondary: mRs 0-1 at 90 days. Recanalization during intervention (TICI score 2B/3 Safety outcomes:Mortality at 90 days, risk of parenchymal hematoma type 2, and symptomatic intracranial hemorrhage.	Proportion of patients with mRS score 0–1 at 90 days was higher in the direct to thrombectomy (MT) population than in the MT plus thrombolysis population (risk difference, −10.1%, RR, 0.82, OR, 0.75, *p* = 0.04).	Acceptable. Although taken from randomised trials, the original data was not randomised to answer this question. Does not differentiate those presenting direct to an MT centre or those presenting to the ASC. Study-level analysis rather than patient-level analysis.
120	P. Löwhagen Hendén et al. (2017). General Anesthesia Versus Conscious Sedation for Endovascular Treatment of Acute Ischemic Stroke: The AnStroke Trial (Anesthesia During Stroke). *Stroke,* 48:6 1601-1607	Randomized trial 90 patients 2013 to 2016	GA vs CSW	MRS 90 days, recan, time intervals the same	No difference	++
120	P. Löwhagen Hendén et al. (2017). General Anesthesia Versus Conscious Sedation for Endovascular Treatment of Acute Ischemic Stroke: The AnStroke Trial (Anesthesia During	Insufficient evidence to show superiority of either approach in clinical practice insufficient to make a firm recommendation for change in clinical practice. Study shows that treating without IVT not clearly detrimental if undergoing	General anaesthesia or conscious sedation with strict periprocedural blood pressure control and normoventilation. CS also performed by anaesthetists	Modified Rankin Scale score ≤2 at 3 months. Intraoperative blood pressure decline from baseline Blood glucose PaCO2 Time intervals	No significant difference in outcomes between the two groups	Acceptable. Small single centre.

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	Stroke). *Stroke,* 48:6 1601-1607	thrombectomy so paves way for trials that can fully investigate.		Degree of successful recanalization National Institutes of Health Stroke Scale score at 24 hours Infarct volume Hospital mortality.		
121	J. S. McDonald et al. (2015). Conscious sedation versus general anaesthesia during mechanical thrombectomy for stroke: A propensity score analysis. *Journal of NeuroInterventional Surgery,* 7:11 789-794	Retrospective cohort of thrombectomy cases (2006-2013) from a US hospital system administrative database including 507 conscious sedation cases compared to 507 propensity score matched database cases (selected from 1999) undergoing GA.	Conscious sedation v GA.	Primary: in-hospital mortality, "unfavourable discharge" destination, discharge to home. Secondary: SAH or ICH, UTI, sepsis, DVT, pulmonary embolism, oedema, congestive heart failure, pneumonia (based on ICD9 coding).	GA associated with higher in-hospital mortality (25% vs 12%, OR=2.37 95% CI 1.68 to 3.37, p<0.0001), reduced likelihood of discharge to home (OR 0.56 (0.40 to 0.79) p=0.0007) and Increased pneumonia (17.0% vs 9.3%, OR=2.0, 95% CI 1.35 to 2.96, p=0.0005) and sepsis (OR 2.93 (1.18 to 8.28) p=0.0170).	-
121	J. S. McDonald et al. (2015). Conscious sedation versus general anaesthesia during mechanical thrombectomy for stroke: A propensity score analysis. *Journal of NeuroInterventional Surgery,* 7:11 789-794	Large cohort study acquired prospectively 06-13 but analysed retrospectively. N = 2512. 80% GA, 20% NOT. Matched 507 of them in each group. Just 6 patients were unmatched in control group. Caliper width applied for matching of 0.25.	GA versus Not in matched groups of 507 – (matched on 7 patient & 4 hospital variables) Several primary variables – death in hospital, discharge to LTC (unfavourable), discharge home (favourable)	ORs of primary & secondary outcomes for matched pairs calculated using Fisher's exact test	GA OR for in hospital mortality 2.37 (1.68-3.337), p<0.0001 GA OR for discharge home 0.56 (0.4-0.79, p = 0.0007 but no sig. difference in unfavourable discharge (due to xss deaths?) ICH/SAH rates similar.	+ Acceptable quality for this type of study, but not equivalent to RCT. Selection bias may be operating in who got GA despite matching on 7 patient variables.
122	S. Nagel et al. (2017). The impact of conscious sedation versus general anesthesia for stroke thrombectomy on the	Posthoc-analysis from a monocentric, prospective, randomized, parallel-group, open-label treatment trial with blinded end point comparing outcome following GA or CS in	Mechanical thrombectomy of identified anterior circulation large vessel occlusion	SIESTA primary outcomes were early neurological improvement in NIHSS after 24 hours. Secondary outcomes were mRS at 3 months, mortality and	Collateral status was associated with smaller post infarct volume but not functional independence at 3 months. When cohort differentiated into collateral	+ A well-constructed primary study with established protocol for GA and randomisation to GA and CS. Low post hoc

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	predictive value of collateral status: A post Hoc analysis of the SIESTA trial. *American Journal of Neuroradiology,* 38:8 1580-1585	patients with hyperacute ischaemic stroke with anterior large vessel occlusion undergoing mechanical thrombectomy (SIESTA). Analysis to eexplore the association of collateral status with 24-hour improvement of the NIHSS score, infarct volume, and mRS at 3 months according to the sedation regimen. N = 104 patients included from the SIESTA study (n = 52 with CS of whom n = 8 converted to GA, n= 48 with no / poor collaterals (Tan 0/1) and n = 56 with moderate / good collaterals (Tan 2/3) on baseline CTA.		peri-interventional parameters of feasibility and safety.	status (0/1 v 2/3), sedation mode did not influence predictive value of collateral status on outcome.	power to detect differences between CS and GA regarding functional outcome at 3 months
122	S. Nagel et al. (2017). The impact of conscious sedation versus general anesthesia for stroke thrombectomy on the predictive value of collateral status: A post Hoc analysis of the SIESTA trial. *American Journal of Neuroradiology,* 38:8 1580-1585	Post hoc analysis of small (n=104) single centre RCT, itself with moderate to high risk of bias.	Impact of type of anaesthesia on predictive value of collateral score for clinical outcome.	Infarct size and clinical outcome by mRS at 90/7.	CS predicted infarct size & early NIHSS clinical outcome irrespective of anaesthesia. In this small study CS didn't predict 90/7 mRS.	Low quality . Collateral Groups not well matched for some possibly important variables – BP, Statins, Smoking, anticoag., premorbid mRS. Evidence of AGE selection bias in those with GA & Poor CS.
123	R. G. Nogueira et al. (2021). Monitored anesthesia care during mechanical thrombectomy for stroke: Need for data-	Retrospective analysis of single centre study reflecting the factors associated with conversion of patients undergoing mechanical	1677 eligible patients studied. Comparison of MAC with MAC who converted to GA procedures.	Rates of conversion of MAC to GA as well as associated factors.	Only factor that was significantly associated with MAC conversion to GA was posterior circulatory stroke. OR 4.99, 95% [1.67 to 14.96]	Low quality/ Adequate + Doesn't answer question. Limitations leading to bias include retrospective, single

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	driven and individualized decisions. *Journal of NeuroInterventional Surgery,* 13:12 1088-1094	thrombectomy from Monitored Anaesthetic Care (MAC) to GA.			Rate of conversion 1.6% (only 26 patients!)	centre (non generalisable) with confounding factors not all adjusted for. Outcome measure (MAC to GA) included small numbers (26 patients), therefore introducing bias and overestimation of associated factors. MAC consists of heterogeneous interventions and therefore one size does not fit all (ie indirectness of intervention exists).
123	R. G. Nogueira et al. (2021). Monitored anesthesia care during mechanical thrombectomy for stroke: Need for data-driven and individualized decisions. *Journal of NeuroInterventional Surgery,* 13:12 1088-1094	A retrospective review of a prospectively maintained MT database.	To identify the predictors of intraprocedural conversion to GA.	How many converted to GA.	1.6%) converted to GA including 1.4% with anterior and 6.5% with posterior circulation strokes.	This was well conducted and showed that GA was not needed very often but, of course, doesn't say which is better.
124	F. Ouyang et al. (2016). Selection of patients and anesthetic types for endovascular treatment in acute ischemic stroke: A meta-analysis of randomized controlled	Worldwide Metaanalysis randomized trials	GA vs CS	EVT under CS better outcome than GA	OR 2.08	+

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	trials. *PLoS ONE,* 11:3 e0151210					
124	F. Ouyang et al. (2016). Selection of patients and anesthetic types for endovascular treatment in acute ischemic stroke: A meta-analysis of randomized controlled trials. *PLoS ONE,* 11:3 e0151210	MA 9 studies n=2476, 9 studies included 3 post-hoc analysis of IMS III and 1 conference abstract, MT for AIS including control patients, papers 2010-2015	MT versus standard care (including TPA alone).	mRS at 90 days, sICH, all cause mortality at 90 days.	MT overall: significant effect in favor of EVT (OR, 1.77; 95% CI, 1.24–2.53; I 2 = 73% sICH no evidence of excess risk for sICH in the EVT group (OR, 1.05; 95% CI, 0.73–1.51, I 2 = 0% all cause mortality at 90 days no difference between the two groups (OR, 0.89; 95% CI, 0.72–1.11; I 2 = 0%) Pre-specified sub group analysis relevant to Q12: Compared with GA, CS yielded better functional outcome (OR, 2.08; 95% CI, 1.47–2.96; I 2 = 0%) without increased risk of sICH (OR, 0.73; 95% CI, 0.39–1.37; I 2 = 0%) or short–term mortality (OR, 0.46; 95% CI, 0.15–1.42; I 2 = 81%).	+ This paper provides a useful meta-analysis of available data to 2015 but is likely to be superseded by more recent MA including HERMES. No indication of included numbers in GA vs CS group, supplement not available to view.
125	R. Pop et al. (2021). Local anesthesia versus general anesthesia during endovascular therapy for acute stroke: A propensity score analysis. *Journal of NeuroInterventional Surgery,* 13:3 207-211	Propensity matching. Retrospective analysis of prospectively collected databases.	Local anesthesia (LA) versus general anesthesia (GA).	Good outcome was defined as 90 days modified Rankin Scale (mRS) ≤2, and successful recanalization as modified Thrombolysis in Cerebral Ischemia (mTICI) 2b-3.	Local anesthesia was associated with a significantly lower proportion of good outcome, lower rate of successful recanalization and more procedural complications. There were no significant differences in 90-day mortality or symptomatic hemorrhagic transformation rates.	This was an average study prone to bias in the two samples

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
125	R. Pop et al. (2021). Local anesthesia versus general anesthesia during endovascular therapy for acute stroke: A propensity score analysis. *Journal of NeuroInterventional Surgery,* 13:3 207-211	Retrospective analysis of prospectively collected data from two stroke centres with differing primary strategies: LA vs GA.	Using propensity scoring, 97 matched patients were analysed in the two centres.	MRS 0-2 at 3/12 Successful recanalisation, procedural complications, 90-day mortality and SICH	Significantly higher pre-treatment NIHSS in LA group and higher rate of drip-and-ship in LA group. In the matched cohort of 97 patients from each centre; good outcome 36.1% vs 52% A vs GA. Successful recan 70.1% vs 95.8$% LA vs GA.	+ Balanced but non-randomised cohort study with relatively small numbers.
126	C. J. Powers et al. (2019). Thrombectomy with conscious sedation compared with general anesthesia: A DEFUSE 3 analysis. *American Journal of Neuroradiology,* 40:6 1001-1005	Sub-analysis from a multi-center, randomized, open-label, blinded end point trial of thrombectomy for ICA and M1 occlusions in patients who could be treated during an extended time window (DEFUSE 3) N = 92 patients randomised to intervention with GA (n = 26) or CS (n = 66)	Mechanical Thrombectomy in extended time window following assessment of clinical and radiological eligibility	The primary outcome was functional independence (mRS score of 0–2) at 90 days, comparing GA with CS. Secondary outcomes included (i) odds ratio of functional independence at 90 days, (ii) median mRS scores at 90 days, (iii) NIHSS score at 24 hours and discharge, (iv) revascularization efficacy (TICI score), (v) median times from symptom onset to imaging, (vi) imaging to arrival in the angiosuite, (vii) arrival to femoral puncture, and (viii) puncture to reperfusion.	Functional independence significantly higher for CS compared to GA or medical management. CS associated with shorter time from arrival in angiosuite to groin puncture, and shorter time from puncture to reperfusion.	+ In DEFUSE 3 decision on anaesthetic approach was at the treating centre's discretion but results did not change when only data from sites with a single departmental anaesthetic policy (i.e. either GA or CS) were studied.
126	C. J. Powers et al. (2019). Thrombectomy with conscious sedation compared with general	Randomized trial	GA vs LA in delayed cohort	Functional independence higher in CS at 90 days	CS superior	++

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	anesthesia: A DEFUSE 3 analysis. *American Journal of Neuroradiology,* 40:6 1001-1005					
127	C. Ren et al. (2020). Effect of Conscious Sedation vs. General Anesthesia on Outcomes in Patients Undergoing Mechanical Thrombectomy for Acute Ischemic Stroke: A Prospective Randomized Clinical Trial. *Frontiers in Neurology,* 11: 170	Prospective single centre randomised trial of GA vs CS in patients undergoing MT for Acute ischaemic stroke. 90 patients were divided into two groups. 36 exclusions.	Randomised GA vs CS.	Primary outcome: 90-day favourable outcome (mRS score 0–2) v unfavourable outcome (mRS 3–6). Secondary outcome: intraprocedural haemodynamic recorded at defined time points. Secondary outcome: successful recanalization >/=mTICI 2b) time metrics (time interval from stroke onset to catheterization laboratory, catheterization laboratory to groin puncture, and groin puncture to recanalization), vasopressor use, satisfaction score of the neurointerventionalist, complications (pneumonia, other infections, vessel perforation, vessel dissection, distal thrombus, and symptomatic	GA had no impact on the discharge or 3 months functional outcome or mortality. CS led to more stable haemodynamics: heart rate and systolic blood pressure significantly lower in the GA group. Higher incidence of pneumonia in GA group. No differences in recanalization rate, satisfaction of the neurointerventionalist, NIHSS and ASPECTS scores at 48 h post-intervention	Acceptable Limitations: Small single centre study. Variable GA type (IV vs inhalational) Target blood pressure not recorded. Self-reported mTICI scores.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
				intracerebral haemorrhage, ASPECTS at 48 hours.		
127	C. Ren et al. (2020). Effect of Conscious Sedation vs. General Anesthesia on Outcomes in Patients Undergoing Mechanical Thrombectomy for Acute Ischemic Stroke: A Prospective Randomized Clinical Trial. *Frontiers in Neurology,* 11: 170	Single site China, RCT, n=90, AIS within MT criteria.	MT with GA or CS.	Primary outcome mRS at 90 days Secondary outcomes: haemodynamics pre and peri procedure, reperfusion (mTICI), time metrics, INR satisfaction, MT complications, ASPECTS, NIHSS, mortality at dsc and 90 days.	Primary outcome: no significant difference (p 0.05) Secondary outcomes related to Q12: INR satisfaction, mTICI, NIHSS, ASPECTS, mortality, mRS – no sig diff Time metrics, fall in MAP – no sig diff Pneumonia – stat higher in GA group (n=12).	0 This paper is a single site RCT with small numbers overall and in subgroup analyses, poorly described randomisation and blinding, it states the anaesthetists were blinded to intervention group which cannot be correct.
128	S. Schönenberger et al. (2016). Effect of Conscious Sedation vs General Anesthesia on Early Neurological Improvement Among Patients With Ischemic Stroke Undergoing Endovascular Thrombectomy: A Randomized Clinical Trial. *Jama,* 316:19 1986-1996	SIESTA (Sedation vs Intubation for Endovascular Stroke Treatment), a single-center, randomized, parallel-group, open-label treatment trial. Patients were randomly assigned to an intubated general anesthesia group (n = 73) or a nonintubated conscious sedation group (n = 77) during stroke thrombectomy.	Intubated general anesthesia group or a non-intubated conscious sedation.	Primary outcome was early neurological improvement on the NIHSS after 24 hours. Secondary outcomes were functional outcome by modified Rankin Scale (mRS) after 3 months (0-6 mortality, and peri-interventional parameters of feasibility and safety.	No significant difference in overall outcome but more patients were functionally independent after GA.	++ This was good quality randomised data
128	S. Schönenberger et al. (2016). Effect of Conscious Sedation vs General Anesthesia on Early Neurological Improvement Among Patients With Ischemic	Heidleberg, Germany, RCT, single centre, parallel-group, open-label, with blinded end point design. Patients with severe anterior circulation stroke (NIHSS score >10) randomized 1:1 to	Randomized to CS or GA during EVT for anterior circulation LVO. Both patient groups received same medications (IV low	Primary outcome: early neurological improvement defined as change in NIHSS score between admission and 24 hour post treatment	Primary outcome: No significant difference between groups in early neurological improvement. Mean change in NIHSS GA -3.2, CS -3.6, p=0.82).	++ The results of this study are directly applicable to the patient group targeted by this guideline. Rates of functional independence at 3 months

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	Stroke Undergoing Endovascular Thrombectomy: A Randomized Clinical Trial. *Jama,* 316:19 1986-1996	either receive CS or GA during EVT. Conducted Apr 2014-Feb 2016, 247 of 1808 acute stroke patients screened for SIESTA. 150 enrolled. GA group 73 pts (48.6%), CS group 77 pts.	dose short acting analgesics and sedatives, higher dose of same in GA group, additional medications in GA group if required) Tight blood pressure parameters in both groups	Secondary outcomes: 52 prespecified secondary outcomes, 47 of which were analysed. Included long term functional outcome by mRS at 3 months. Also included delayed extubation, mortality, periinterventional safety and feasibility outcomes.	No significant differences for primary outcome between groups in the sensitivity analyses or subgroup analyses including in subgroup with successful reperfusion (TICI 2b/3) Secondary outcomes: No significant differences shown between groups for 41 of the 47 analysed secondary outcomes. Significantly greater proportion of patients in GA group achieved mRS 0-2 at 3 months (37% vs 18.2%, p=0.01). This difference however was not paralleled by a consistent shift over all mRS categories, and should be interpreted with caution. Post hoc analysis showed no significant differences between groups for 3 month mRS 0-1 and 3 month mRS 0-3. Imbalance between groups for ASPECT score and reperfusion rate although not statistically significant may have influenced. Mean 10 minute faster door to arterial puncture time in CS group (p=0.03). Duration of EST shorter in GA group by mean 18.2 min (p=0.04). Greater rate of postprocedure complications in GA group: hypothermia, delayed	(37% GA vs 18.2% CS) were lower than previous thrombectomy trials, however strokes in the study were severe requiring NIHSS >10 for inclusion, and the study allowed greater baseline functional disability and less stringent imaging selection criteria than prior thrombectomy trials.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
					extubation, pneumonia. 14.3% conversion rate of CS to GA.	
129	S. Schonenberger et al. (2019). The KEEP SIMPLEST Study: Improving In-House Delays and Periinterventional Management in Stroke Thrombectomy-A Matched Pair Analysis. *Neurocritical Care,* 31:1 46-55	Prospective single centre observational study of an SOP for ET management including conscious sedation regime of esketamine and propofol (n=154) comparing workflow metrics with historical CS cases that used a propofol, esketamine and remifentanil regime in one arm of the SIESTA RCT, matched by propensity score matching (n=74)	Conscious sedation with .esketamine+propofol v remifentail+propofol+ esketamine	Primary: Delta NIHSS 24h-baseline. Secondary: mRS at day 90; in-hospital and 3 mont hmortality, periinterventional hypo- or hypertension, procedural complocations, time to recanalise.	No difference in NIHSS change, 3m mRS, mortality, safety. Shorter door to recanalization, procedural duration and other workflow times intervals with SOP that includes a simplified CS regime.	+
129	S. Schonenberger et al. (2019). The KEEP SIMPLEST Study: Improving In-House Delays and Periinterventional Management in Stroke Thrombectomy-A Matched Pair Analysis. *Neurocritical Care,* 31:1 46-55	Prospective single centre observational study with matched pairs analysis comparing periinterventional management of AIS patients with anterior circulation LVO undergoing EVT. Compared pts managed with a new protocol and SOP for conscious sedation (CS) to the CS group of the SIESTA trial. Matching procedure by propensity scores approach. Age, admission NIHSS, premorbid mRS, CT ASPECTS included as matching variables. SIESTA CS group 77 pts, 74 with full data entered into match. KEEP SIMPLEST: 161 pts, 154 with full data set	New KEEP SIMPLEST SOP: Conscious sedation for EVT. Main innovation was implementation of a new mobile endovascular stroke treatment cart. Also changed combination of sedatives. Compared KEEP SIMPLEST patients with CS arm of SIESTA trial.	Primary outcome: Early neurological improvement (change in NIHSS between admission and 24 hours post treatment) Secondary outcomes: mRS at 3 months, mortality in hospital and at 3 months, periinterventional safety, time window of recanalization	Primary outcome: No significant difference between groups (change NIHSS -4.3 SIESTA vs -3.8 KEEP SIMPLEST, p=0.79) Secondary outcomes: No significant difference between groups for mRS 0-2 at 3 months, mortality, recanlization rate. KEEP SIMPLEST group significantly lower mean door to recanalization time, mean duration of EST time, mean door to first angiographic image time, mean CT to first angiographic image time. Longer mean length of hospital stay in KEEP SIMPLEST group (6.4 vs 4.5 days, p=0.01) Incidence of critical hypo and hypertension after MT	++ The results of this study demonstrate safety and feasibility of CS, and highlight improvements that can be made to reduce key time metrics. The study however compared two groups of patients having EVT with CS, and does not include a GA group. It is therefore not directly applicable to the PICO question.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
		Matching procedure found 69 pairs – total n in matched pairs analysis 138.			significantly lower with KEEP SIMPLEST group	
130	Y. Silva et al. (2021). Impact of general anesthesia on posterior circulation large vessel occlusions after endovascular thrombectomy. *International Journal of Stroke,* 16:7 792-797	Setting Analysis of prospective CICAT Registry data of stroke admissions in Catalonia from Jan 2016 to Jan 2020 Design Retrospective analysis of cohort included in Registry with posterior circulation large vessel occlusion. Logistic regression to adjust for relevant factors on univariate analysis associated with poor outcome and GA Subjects N = 298 with 106 GA and 192 CS	Mechanical thrombectomy for hyperacute ischaemic stroke and proximal large vessel arterial occlusion in the posterior circulation.	Primary outcome was good function (mRS 0-2) at 90 days.	Patients in whom EVT was performed using GA presented significantly worse clinical outcome at three months and higher mortality. In the multivariate analysis, GA use and multiple device passes were identified as independent predictors of poor outcome.	+ Comment limitations noted and include - retrospective design, no common protocol for GA, very large difference in stroke severity between two groups and CT based imaging scoring at baseline.
130	Y. Silva et al. (2021). Impact of general anesthesia on posterior circulation large vessel occlusions after endovascular thrombectomy. *International Journal of Stroke,* 16:7 792-797	POST CIRCULATION. CICAT registry 298 patients 2016 to 2019	GA vs CS.	GA less likely to give good outcome than CS .	19.7% vs 45.1%.	++
131	C. Z. Simonsen et al. (2018). Effect of general anesthesia and conscious sedation during endovascular therapy on infarct growth and clinical outcomes in acute ischemic stroke a randomized clinical	Randomised controlled trial. Single centre. Single blinded trial [GOLIATH]. Subjects included anterior circulatory ischaemic stroke < 6 hours with specific criteria > NIHSS 10, MRI compatible with core volumes < 70 ml, pre-morbid mRS 2 or less, GSC > 9.	GA versus Conscious sedation (randomised 1:1 before MT).	Primary Outcome: Infarct growth (MRI at baseline and 48-72 hours). Secondary Outcome: mRS at 90 days, reperfusion (TICI 2b/3).	Of 1372 screened, 128 patients were included and randomised (65 to GA and 63 CS). Median NIHSS 18. 6.3% of CS converted to GA. Infract growth was non significantly smaller with GA group (8.2 mls vs 19.4 mls).	+ RCT Small Single Centre Non generalisable

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	trial. *JAMA Neurology,* 75:4 470-477				Higher proportion of patients with good outcome on ordinal shift (OR 1.91 [1.03 to 3.56] with GA . Higher rates of reperfusion with GA (50%) vs CS (38%). 9 minute delay with GA from arrival from neurointerventional suite to groin puncture but no difference in time of onset to reperfusion between both groups. Note blood pressure reduction (significant) in GA group (> 20 mmHg).	Primary outcome : infarct size and not functional outcome
131	C. Z. Simonsen et al. (2018). Effect of general anesthesia and conscious sedation during endovascular therapy on infarct growth and clinical outcomes in acute ischemic stroke a randomized clinical trial. *JAMA Neurology,* 75:4 470-477	Single centre small RCT; N = 128; BUT ENROLLED <2/3 of MT cases performed during the trial by unit. Disproportionate number of those done outside trial were "low risk" on either NIHSS or imaging. Systematic selection bias.	GA for MT; control = heavy CS (this isn't standard in many centres or studies) Major issue re generalisability as control arm not standard of care in many/most units.	Blinded assessments used. Primary endpoint was infarct growth on imaging. There was no difference But emphasis in manuscript & presentations was all on clinical and reperfusion outcomes.	No diff in primary outcome. Borderline better reperfusion in GA arm (p=0.04). On shift analysis (not sig. on dichotomised) borderline lower mRS (1.91; 1.03-3.56).	+ Biggest problem is the control arm is not Standard Care in many/most units.
132	C. Z. Simonsen et al. (2021). General anesthesia during endovascular therapy for acute ischemic stroke: benefits beyond better reperfusion?. *Journal*	Post hoc analysis of individual data patient meta-analysis involving 3 RCT (SIESTA, ANSTROKE and GOLIATH) evaluating method of GA versus conscious sedation on functional outcome and reperfusion. N=368 patients with 185 patients	General anaesthetic versus conscious sedation. Intention to treat.	mRS 0-2 (good functional outcome). Reperfusion as a mediator of good functional outcome (TICI > 2b).	Total effect of GA vs CS on beneficial outcome was 0.15 (95% 0.04 to 0.25) The direct effect of GA listed a risk difference of 0.12 (95% CI: 0.01 to 0.22) and the indirect effect (mediated through	Acceptable quality Doesn't directly answer the question posed. Post hoc analysis of 3 small single centre randomised controlled trials.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	of neurointerventional surgery, :	randomised to conscious sedation. Aim to ascertain whether good functional outcome seen in patients under GA is driven/mediated by better reperfusion.		Measurement of risk difference between both GA and CS on functional outcome, comparing both direct effects and indirect effects of GA.	reperfusion) was a risk difference of 0.13 (95% CI: 0.02 to 0.04). Ie only a small proportion of the effects were mediated through reperfusion.	Open label study. Primary outcome (good functional outcome) only evaluated in one study. European population only (generalizable). Dose response to GA not studied nor BP variability.
132	C. Z. Simonsen et al. (2021). General anesthesia during endovascular therapy for acute ischemic stroke: benefits beyond better reperfusion?. *Journal of neurointerventional surgery,* :	Mediation Meta-analysis of 3 small single centre RCTs. RCT data from all MT trials not randomising on GA as the intervention were excluded. N = 368.	GA vs CS. However, CS varied between trials but in only 1/3 was it more reflective of widespread usual practice.	Main outcome measure was dichotomised mRS 0-2 as good outcome.	Risk difference 0.15 (0.04-0.25), RR 1.29 (1.07 to 1.54).	- Methodology poorly explained & not sure if appropriate or not Internal validity poor: Not systematic review with no comprehensive lit search. Can't say who extracted data. Only 3 studies considered with no excluded studies listed. Study quality not assessed/reported No assessment of publication bias as self-selected own 3 studies.
133	L. A. Van Den Berg et al. (2015). Type of Anesthesia and Differences in Clinical Outcome after Intra-Arterial Treatment for Ischemic Stroke. *Stroke,* 46:5 1257-1262	Retrospective multi centre observational data analysis of 16 Dutch stroke centres undertaking MT in anterior circulatory with LVO comparing GA versus. Old study (2002-2013).	GA versus CS.	mRS (0-2) at 90 days. TICI 2b/3 score as a measure of reperfusion.	348 patients included in analysis 70 (GA) versus 278 (CS) Patients in GA group were younger, more likely to be treated with MT and had longer time from onset to starting MT	- Scientific quality low quality Retrospective Old data (> 20 years) Observational rather than randomised

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
					Good clinical outcome was 14% (GA) versus 26% (CS) which was significant however after adjusting for case mix, this statistical significance was lost. Reperfusion: higher rates seen in GA (49%) v 43% (CS).	All confounders not adjusted for No data on type of anaesthetic used Lost to follow up .
133	L. A. Van Den Berg et al. (2015). Type of Anesthesia and Differences in Clinical Outcome after Intra-Arterial Treatment for Ischemic Stroke. *Stroke,* 46:5 1257-1262	Retrospective cohort study of MRCLEAN pretrial patients in 16 Dutch centres totally 348 patients; 278 lA vs 70 GA.	GA vs LA and conversion for stroke MT in anterior circulation.	MRS, TICI recanalisation rates, complications.	Good outcome in 26% non-GA and 14% in GA groups. Mortality 21% vs 17% GA vs Non GA. Logistic regression showed non GA had better outcomes. No difference in SICH or reperfusion rates.	+ Retrospective cohort study.
134	D. Yang et al. (2018). General Anesthesia may have Similar Outcomes with Conscious Sedation in Thrombectomy Patients with Acute Ischemic Stroke: A Real-World Registry in China. *European Neurology,* 80:01-Feb Jul-13	This was basically a case controlled study form. The patients were included from the Endovascular Treatment for Acute Anterior Circulation (ACTUAL) [25] ischemic stroke Registry.	The propensity score analysis with 1: 1 ratio was used to match the baseline variables between patients with general anesthesia and the conscious sedation.	The 90-day modified Rankin Scale (mRS), symptomatic intracranial hemorrhage (sICH), and death were compared between groups.	No significant differences.	This was average and did not show any useful differences.
134	D. Yang et al. (2018). General Anesthesia may have Similar Outcomes with Conscious Sedation in Thrombectomy Patients with Acute	Chinese Registry. Selection of 21 centres unclear. Retrospective Enrolment for 2.5y. 698 patients but not clear how many may have had EVT outside of Registry in 21 centres over 2.5y but possibly lots. S	GA was based on patient criteria open to operator interpretation – so systematic enrolment bias. CS was not totally defined so	Primary outcome not stated. Usual process, safety and outcome measures reported. Major imbalance in IVT between groups is a major	No significant outcome or safety measure differences in matched pairs analysis. Nearly 20% of GA cases though were not matched – indicating selection bias.	Bias too high to be acceptable here. Most of patient data not actually included. Retrospective Registry.

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
	Ischemic Stroke: A Real-World Registry in China. *European Neurology,* 80:01-Feb Jul-13	tandard eligibility criteria for EVT. This is a post hoc study of Registry. 80% CS, 20% GA. 114 matched pairs then analysed.	control remains bit unclear. What is described indicates heavy sedation.	confounder outside matched pairs analysis.		
697	A. Maurice et al. (2022). General Anesthesia versus Sedation, Both with Hemodynamic Control, during Intraarterial Treatment for Stroke: The GASS Randomized Trial. *Anesthesiology* 136:4 567-576	Single blinded RCT across 4 French centres conducting MT in patients with IS with LVO comparing GA vs Conscious sedation.	GA vs Conscious sedation With standardised protocol for BP management during MT procedure.	mRS at 90 days primary outcome.

Secondary outcome: hypotensive/hypertensive episodes, recanalization TIC 2b 3 . | 345 patients included 176 (CS) and 169 (GA) 4% CS converted to GA mRS 0-2 (CS=36%) vs (40%=GA). Non significant

Greater hypotensive episodes with GA but greater recanalization rates. This however did not translate in outcome benefit . | No difference in outcome so no change to recommendation and highlights that basis of GA/CS governed by individual case assessment. Most recent study so consider including this in evidence to recommendations. |
| 697 | A. Maurice et al. (2022). General Anesthesia versus Sedation, Both with Hemodynamic Control, during Intraarterial Treatment for Stroke: The GASS Randomized Trial. *Anesthesiology* 136:4 567-576 | Single blind RCT, MULTICENTRE in France.

LVO AIS undergoing EVT. | Randomised to standard GA or standard Conscious Sedation 1:1

Not stratified by age or bNIHSS or occlusion site

Actually moderate CS not mild | 90/7 0-2 of mRS However 2-6 months was actual range

EXCEPT odd adjustment on bNIHSS of 14+ vs <14

Usual secondary outcomes + some BP ones. | Primary: 38% CS vs 40% GA

RR = 0.91, 0.69-1.19, P=0.474

10 crossovers – not low but acceptable

More hypo and hypertensive episodes in GA group

Time to puncture significantly longer with GA & trend to longer time to reperfusion

TICI 2B/3 higher in GA group by 10% (p=0.02)

No sig differences in usual safety outocmes except ICH not reported! | Supports that we continue to say either GA or CS may be used

BORDERLINE – moderate bias risk for RCT & analysis/design flaws

351 randomised of 3472 screened – no info on 90% exclusions!

Inadequate stratification = some important imbalances

No ICH report

Outcome assessments blinded but not really single blinded as described (neither patient or operator blinded) |

Ref ID	Source	Setting, design and subjects	Intervention	Outcomes	Results	Evidence quality (SIGN checklist score) and comment
						Still uncertain if mild CS/LA superior or not to GA.