

Quantitative Synthesis

Quantitative Synthesis displays the results of a nest's [extraction](#). Use this page to drill down on the outcomes of your research by Intervention or by study (**Summary** page), to see the distribution of results across individual studies (**Distribution** page), or view inferential statistics and forest plots for comparisons within your nest (**NMA** page).

1. Navigate to Quantitative Synthesis

From the Nest menu, click on “Synthesis” in the left hand menu.

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Protocol: Balloon Guide Catheter Systematic Review and Meta-analysis

Literature Search and Study Selection

A Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)- compliant systematic review was undertaken using the PubMed database to identify studies using BGCs for treatment of stroke published between January 1, 2010, and February 8, 2021. Search strings included: 1) BGC or "balloon guide catheter" or "balloon guiding catheter") AND (stroke OR AIS); 2) (BGC OR "balloon guide" OR "balloon guiding" AND ("thrombectomy" OR "embolectomy"); 3) ("distal emboli" OR "clot fragmentation") AND "thrombectomy" AND (stroke OR AIS); and 4) ("proximal flow arrest") AND (stroke OR AIS).

Inclusion/Exclusion Criteria

Inclusion criteria were:
1) multi-arm studies reporting thrombectomy outcomes with BGCs or non-BGC approaches (stent retrievers, contact aspiration, combination therapy, and not specified/other);
2) randomized controlled trials and prospective registry/cohort studies; and
3) studies reporting patient angiographic and clinical outcomes of MT and/or intravenous thrombolysis for AIS based on therapy used.
Exclusion criteria were single-arm cohort studies, animal studies, case reports, meta-analyses, interim reports, editorials or letters to the editor, secondary analyses, comparisons of a single device, did not relate to the search topic, or those that did not report patient outcomes.
Detailed results of our study search, screening, and data-extraction process are hosted on the Nested Knowledge website (www.nested-knowledge.com). Three independent authors (A.B., N.H., S.M.) screened studies for eligibility. Eligible studies were then independently evaluated by another author (J.M.P.).

Variables and Patient Characteristics

Data from each study were independently extracted by 3 authors (N.H., M.S., S.M.) and confirmed by another author (J.M.P.). Demographic data and treatment characteristics collected included age, sex, baseline National Institutes of Health Stroke Scale (NIHSS) score, intravenous tissue plasminogen activator use, and onset-to-puncture time. Outcomes of interest included good clinical outcome (modified Rankin Scale [mRS] score of 0-2 at 90 days), 90-day mortality, complete recanalization (TICI 3), FPE TICI 3, puncture-to-recanalization time, number of passes required to achieve recanalization, distal embolization to new territory, and symptomatic intracerebral hemorrhage (sICH). Subgroup analyses were performed to compare outcomes among the following thrombectomy techniques: 1) stent retrievers, 2) aspiration, 3) combination therapies, and 4) stent-retrievers or aspiration (when studies did not separate outcomes by technique).

Notes

Your Mentions

All Mentions

Kevin Kallmes

11/17/21, 12:17 PM

@Ranita Tarchand Done!

Ranita Tarchand

11/17/21, 12:16 PM

@Kevin Kallmes Can I get Admin?

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Then, from Synthesis Home, click on the “Quantitative Synthesis” section.

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Synthesis: Thrombectomy alone vs. Thrombectomy plus thrombolysis

Synthesis

Qualitative

Quantitative

Manuscript

Risk of Bias

PRISMA

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Abstract

Mechanical thrombectomy (MT) is now the standard-of-care treatment for acute ischemic stroke (AIS) of the anterior circulation and may be performed irrespective of intravenous tissue plasminogen activator (IV-tPA) eligibility prior to the procedure. This study aims to understand better if tPA leads to higher rates of reperfusion and improves functional outcomes in AIS patients after MT and to simultaneously evaluate the functionality and efficiency of a novel semi-automated systematic review platform.

The Nested Knowledge AutoLit semi-automated systematic review platform was utilized to identify randomized control trials published between 2010 and 2021 reporting the use of mechanical thrombectomy and IV-tPA (MT+tPA) vs. MT alone for AIS treatment. The primary outcome was the rate of successful recanalization, defined as thrombolysis in cerebral infarction (TICI) scores $\geq 2b$.

Four studies with 1,633 patients, 816 in the MT+tPA arm and 817 in the MT arm, were included in the meta-analysis. In each study, patient populations consisted of only tPA-eligible patients and all imaging and clinical outcomes were adjudicated by an independent and blinded core laboratory. Compared to MT alone, patients treated with MT+tPA had higher odds of eTICI $\geq 2b$ (OR = 1.34 [95% CI: 1.10; 1.63]).

Administering tPA prior to MT may improve the rates of recanalization compared to MT alone in tPA-eligible patients being treated for AIS, but a corresponding improvement in functional and safety outcomes was not present in this review.

Key Insights:

No significant difference in 90-day mRS 0-2, sICH, 90-day mortality or distal emboli

View in Context

There were no statistically significant differences in the rates of 90-day mRS 0-2 (OR = 0.98 [95% CI: 0.77; 1.24]), 90-day mortality (OR = 0.94 [95% CI: 0.63; 1.41]), sICH (OR = 0.55 [95% CI: 0.28; 1.06]), or distal emboli (OR = 0.85 [95% CI: 0.45; 1.61]).

2. Explore Summary

In the top-middle of the page “Summary” is automatically selected:

About Docs Support AutoLit Nicole

Quantitative Synthesis: Thrombectomy alone vs. Thrombectomy plus thrombolysis

Summary

Distribution

NMA

Fixed Effects

Random Effects

Intervention	Outcome			Outcome			Outcome		
	TICI 2b/3			mRS 0-2			Mortality		
	(n/N)	%	[CI]	(n/N)	%	[CI]	(n/N)	%	[CI]
Interventions	1334/1599	84.4%	[81.0%, 87.3%]	747/1633	48.2%	[42.1%, 54.5%]	276/1633	16.5%	[14.0%, 19.4%]
▶ Mechanical thrombectomy	648/796	82.8%	[77.3%, 87.1%]	376/817	49.2%	[39.2%, 59.3%]	142/817	16.7%	[12.7%, 21.6%]
▶ Mechanical thrombectomy plus IVT	686/803	85.9%	[81.7%, 89.2%]	371/816	47.5%	[38.5%, 56.6%]	134/816	16.1%	[12.6%, 20.2%]

Default Summary View

In the Default View:

- In the left column, **Interventions** are displayed down to the second level (that is, the nodes below the Root Node selected as Interventions).
- In the other 3 columns, **Data Elements** are displayed, and the most commonly-reported Data Elements are shown by default. In the cells below, results are broken down into:
 - For **Dichotomous variables**, the event rate (n), total population (N), percentage (see *Random/Fixed Effects*), and a 95% Confidence Interval.
 - For **Continuous variables**, the mean/median, standard deviation (SD)/range/interquartile range (IQR), and a 95% Confidence Interval.
 - For **Categorical variables**, the event rate (n) for each category, as well as the total population (N) upon hovering.

Note: All Data Elements are classified as Baseline or Outcome during timepoint selection. The Data

Element classification is displayed above each column upon selection.

From this Default View, you can manipulate the Interventions, Data Elements, and even statistic type to drill down on findings.

Random vs. Fixed Effects

- **Random/Fixed Effects:** Across all Quantitative Synthesis pages, estimates and percentages displayed by Default are actually Random Effects calculations. To toggle to Fixed Effects (that is, an estimate based on an assumption of [constancy or non-randomness](#)), use the toggle in the upper right of the table.

Expand Interventions

Click on an Intervention of interest to expand down to see its children. This can be done recursively, meaning that if your top-level Interventions have multiple layers below them, each click will expand the next level down.

View Individual Underlying Studies

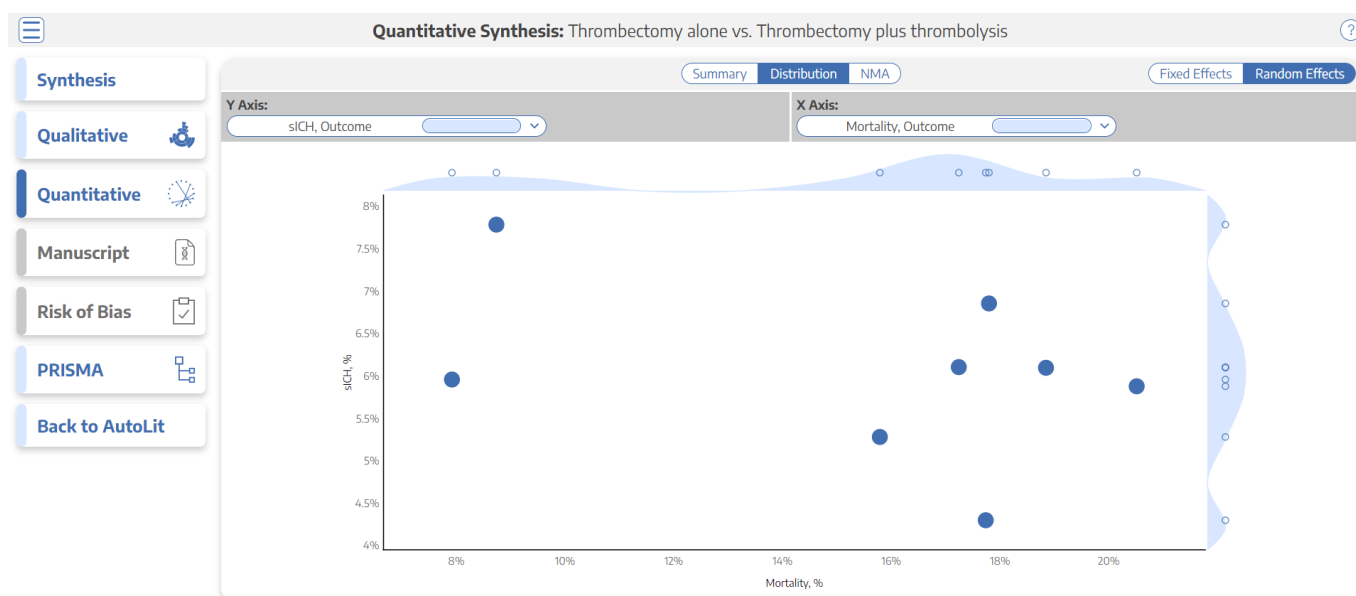
If there are no levels below a given Intervention, clicking on it will display the underlying studies and their associated Data Elements.

Choose Data Elements / Columns

To choose different Data Elements, click on the drop-down at the top of a column, view the list of all Data Elements (with a bar that represents *data density*, or the rate at which it was reported across studies), and select the Data Element of interest.

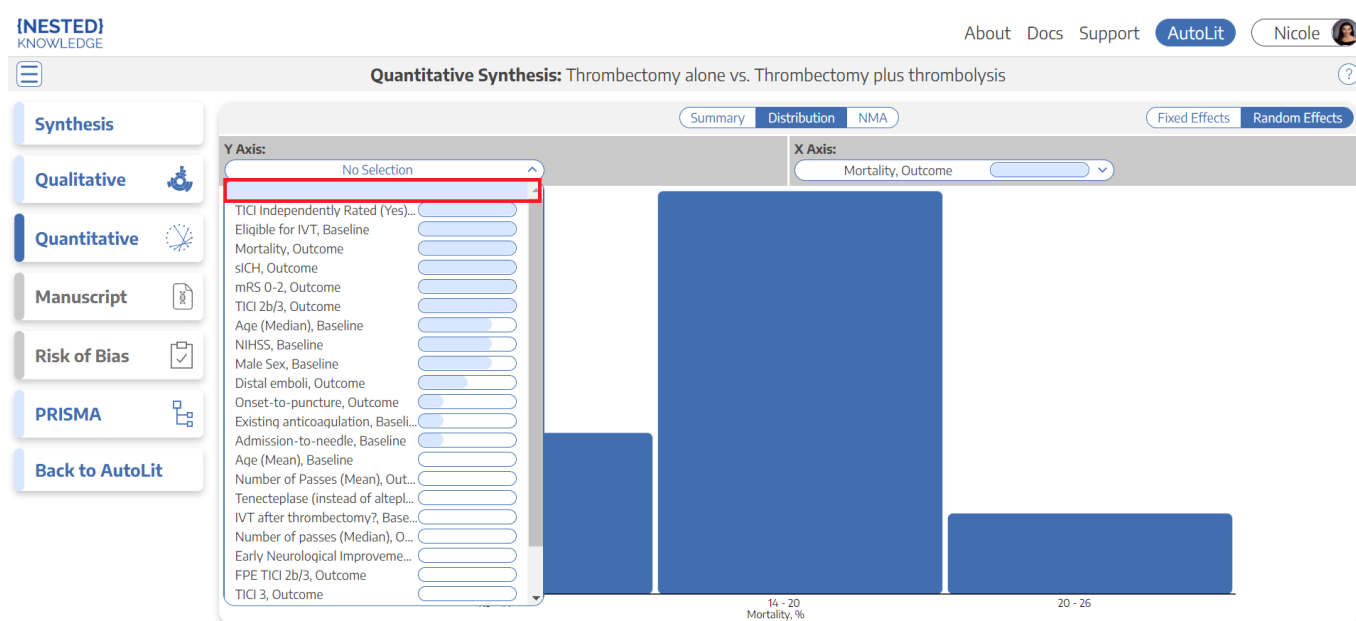
3. Explore Scatter Plot

In the top-middle of the page “Distribution” is highlighted. This page shows statistical relationships between Interventions and tags such as “slCH” and “Mortality” in a scatterplot formation.



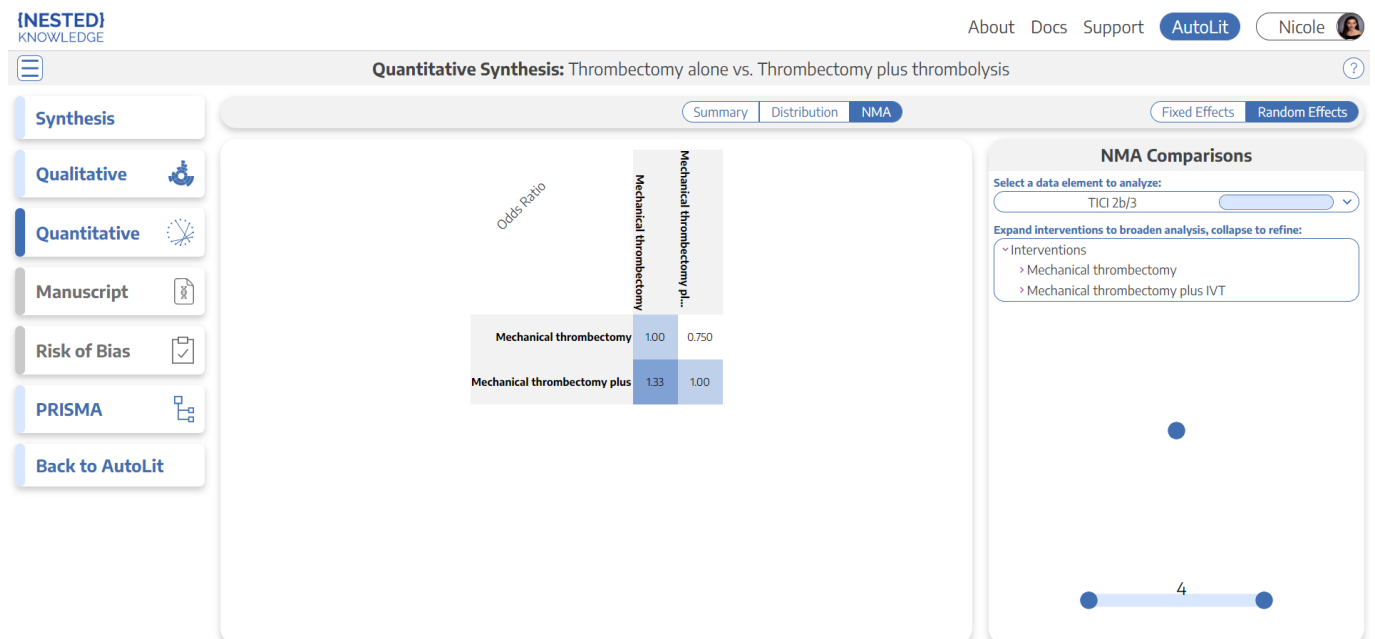
In this page, select the X and Y axes to designate the Data Elements of interest. This will generate a chart that shows the distribution of studies based on their rate of each Data Element. Furthermore, hovering over any node in the Distribution page will show you the study the node represents, and clicking on it will open a study modal showing the abstract, data, tags, and search history of that study.

Histogram view: To view a histogram of findings for a single data element, go to the Y Axis selector, and click on the first option, which looks like a blank field. This will generate a histogram showing the distribution of findings across studies with respect to one, not two, data elements.



4. Explore NMA

In the top-middle of the page, click "NMA". The Network Meta-Analysis (NMA) allows you to explore Odds Ratios and Forest Plots from an automatically-generated model.



WARNING: The automatically-generated Network Meta-analysis uses generally accepted practices to calculate odds ratios and other outputs. However, you should use and interpret these findings with care:



- Comparative Studies Only:** NMA depends on comparative evidence, meaning that the studies analyzed will **only** represent those with 2 or more Study Arms.
- Potential Bias:** these outputs are only as trustworthy as the underlying studies. Any bias in the underlying studies will be carried through or even magnified by NMA, so completing an independent measure of heterogeneity and working to minimize bias are crucial steps, and even if followed, all NMA outputs should be interpreted with caution.

Default NMA

By default, your NMA page will show top-level Interventions (those just below the Root Node selected as your Interventions), compared with respect to the most-commonly-reported Data Element. This page will display:

Odd Ratio Chart

The Odds Ratio Chart shows all Interventions listed on both axes. The cells represent the odds ratio between the Intervention displayed in the row and the Intervention displayed in the column.

For instance, in the diagram below, the black box displays the odds of mortality for Mechanical Thrombectomy plus IV-tPA compared to Mechanical Thrombectomy alone ($0.937 : 1$), while the red box displays the odds of mortality for Mechanical Thrombectomy alone with respect to Mechanical Thrombectomy plus IV-tPA ($1.07 : 1$), or the inverse of the red box.

Odds Ratio		Mechanical thrombectomy plus...	
		Mechanical thrombectomy	Mechanical thrombectomy plus...
Mechanical thrombectomy	Mechanical thrombectomy plus	1.00	1.07
		0.937	1.00

Selecting Data Elements and Interventions

To select the Data Element you would like to show odds for, use the drop-down in the upper right, in the “NMA Comparisons” panel (red outline below).

To select the level of analysis for Interventions, use the listing below the Data Element drop-down. Like the first column of Summary, selecting an Intervention in this list (red box). will expand to display the next level down in the hierarchy of Interventions. When an Intervention is expanded down to the lowest level (black box), it will have no 'carat' indicating expandability and clicking will not change the selection.

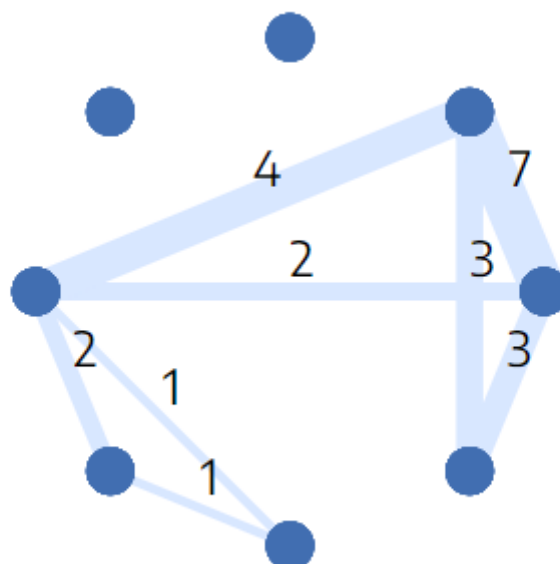
NMA Comparisons

Select a data element to analyze:

mRS 0-2 at 90D

Expand interventions to broaden analysis, collapse to refine:

- Interventions
 - Mechanical thrombectomy
 - Stent-triever
 - Aspiration
 - Combination therapy
 - Unknown MT
 - Thrombolysis/Medical therapy
 - Mechanical Thrombectomy + IVT



Once you have selected your Intervention levels, the NMA Chart will display the number of studies comparing each of your Interventions of interest. Each node represents an Intervention (hover to see the Intervention title), and each line represents the number of studies comparing any two nodes.

SUCRA & Forest Plot of Interventions

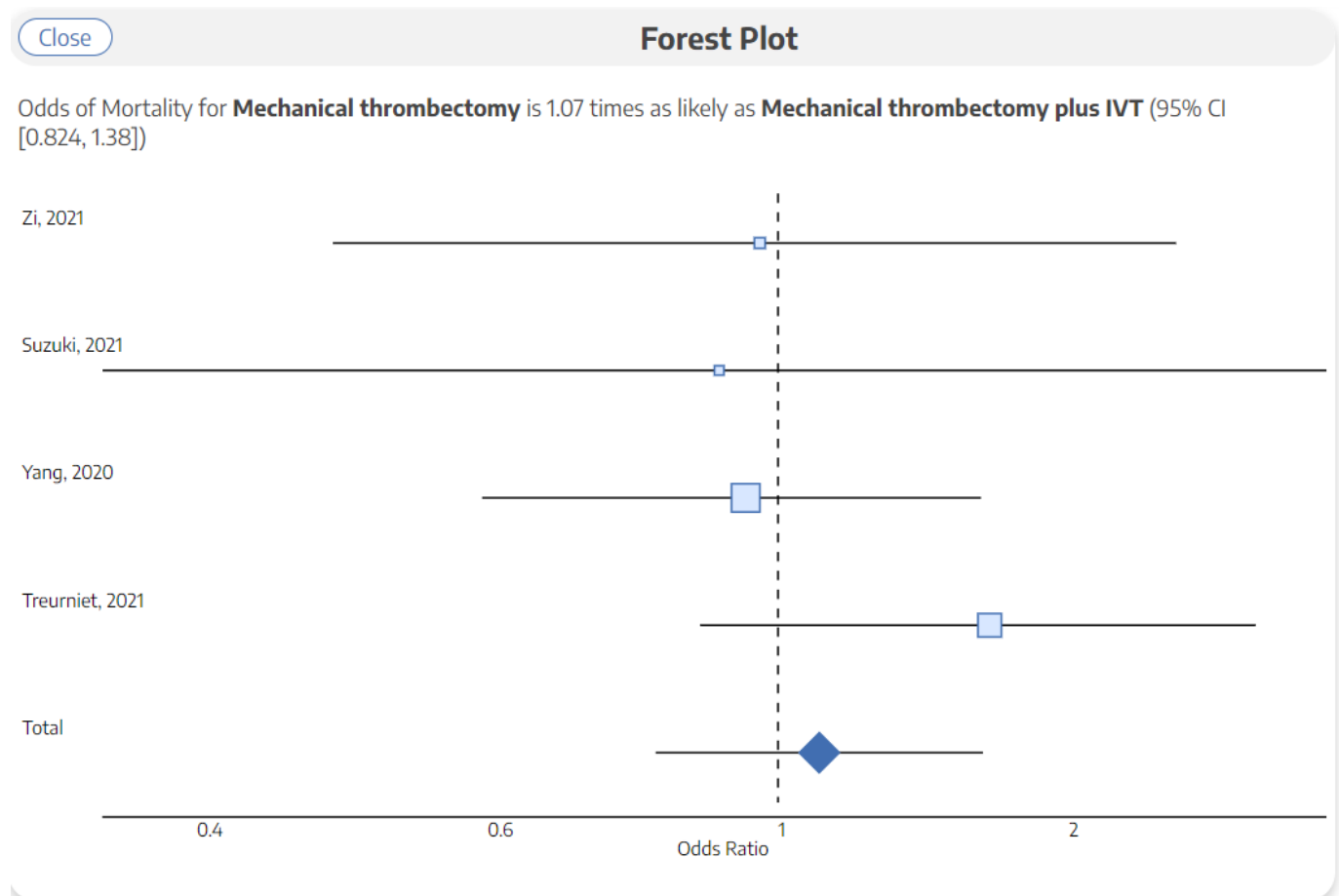
Clicking on any Row or Column will create a **SUCRA ranking**, which displays Interventions in order based on their odds of achieving a given outcome. So, if high odds represent patient benefit, the 1st Intervention in the ranking represents a preliminary estimate of where that Intervention ranks in terms of patient benefit.

This will be supported by a **Forest Plot** displaying the Odds Ratio and a 95% Confidence Interval for the Intervention chosen compared to all other Interventions in the Odds Ratio Chart.

Forest Plot of Underlying Studies

Clicking on any cell will create a **Forest Plot** for the specific comparison represented by that cell. It will display the Odds Ratio and a 95% Confidence Interval for all underlying studies reporting the two Interventions being compared, as well as a cumulative Odds Ratio and 95% Confidence Interval.

The cumulative Odds Ratio and 95% Confidence Interval will also be listed at the top of the page.



Calculation Methods for Quantitative Synthesis

To see how statistics are calculated for Quantitative Synthesis, including for the NMA, see [here](#).

From:
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