INTISARI

Perbandingan Biaya *Mechanical Thrombectomy* Pada Pasien Stroke Iskemik Akut Oklusi Pembuluh Darah Besar dengan Teknik *Direct Aspiration*, *Stent Retriever* dan *Solumbra*: *A Rapid Review*

Latar Belakang: Stroke iskemik akut (SIA) merupakan penyebab utama morbiditas dan mortalitas global dengan dampak signifikan terhadap kualitas hidup pasien dan beban ekonomi sistem kesehatan. Oklusi pembuluh darah besar (OPDB) terjadi pada sekitar 24–46% kasus SIA dan memerlukan tatalaksana reperfusi yang cepat dan efektif. *Mechanical thrombectomy* (MT) merupakan standar terapi pada SIA-OPDB, dengan teknik yang paling sering digunakan yaitu direct aspiration (DA), stent retriever (SR), dan teknik kombinasi *Solumbra*. Selain luaran klinis, pertimbangan biaya menjadi faktor penting dalam pemilihan teknik MT. Namun, hingga saat ini belum terdapat *rapid review* yang secara khusus membandingkan biaya ketiga teknik tersebut.

Tujuan: Penelitian ini bertujuan untuk membandingkan biaya mechanical thrombectomy dengan teknik DA, SR, dan *Solumbra* pada pasien SIA-OPDB melalui metode rapid review.

Metode: Penelitian ini menggunakan metode *rapid review* dengan kerangka PRISMA. Pencarian literatur dilakukan melalui PubMed, Scopus, ScienceDirect, dan Cochrane Library menggunakan kata kunci "*acute ischemic stroke*", "*mechanical thrombectomy*", "*direct aspiration*", "*stent retriever*", "*Solumbra*", dan "*cost*". Kriteria inklusi meliputi studi yang dipublikasikan dalam 10 tahun terakhir, membandingkan teknik MT, serta melaporkan data ekonomi. Data yang diekstraksi mencakup karakteristik studi serta luaran berupa biaya total, biaya langsung medis, dan biaya tidak langsung.

Hasil: Sebanyak sembilan studi memenuhi kriteria inklusi. Rerata biaya total MT terendah terdapat pada teknik SR sebesar Rp127.952.353,05, diikuti DA sebesar Rp130.308.847,01, sedangkan *Solumbra* menunjukkan biaya tertinggi (Rp329.470.646,97). Biaya langsung medis paling rendah terdapat pada teknik DA (Rp53.914.761,32), dibandingkan SR (Rp114.258.879,64) dan *Solumbra* (Rp144.414.207,24). Biaya tidak langsung hanya dilaporkan oleh satu studi, dengan nilai tertinggi pada teknik *Solumbra* dan terendah pada DA.

Kesimpulan: Terdapat perbedaan biaya *mechanical thrombectomy* pada pasien SIA-OPDB, dengan SR menunjukkan rerata biaya total terendah dan *Solumbra* tertinggi, sementara DA memiliki rerata biaya langsung medis paling rendah.

Kata Kunci: stroke iskemik akut, *mechanical thrombectomy*, *direct aspiration*, *stent retriever*, *Solumbra*, biaya

ABSTRACT

Cost Comparison of Mechanical Thrombectomy in Acute Ischemic Stroke Patients with Large Vessel Occlusion Using Direct Aspiration, Stent Retriever, and *Solumbra* Techniques: A Rapid Review

Background: Acute ischemic stroke (AIS) is a leading cause of global morbidity and mortality, with substantial impact on patients' quality of life and healthcare system expenditures. Large vessel occlusion (LVO) accounts for approximately 24–46% of AIS cases and requires timely and effective reperfusion therapy. Mechanical thrombectomy (MT) is the standard treatment for AIS-LVO, with the most commonly used techniques being direct aspiration (DA), stent retriever (SR), and the combined *Solumbra* technique. In addition to clinical outcomes, cost considerations are important in selecting MT techniques; however, comparative cost evidence among these approaches remains limited.

Objective: This study aimed to compare the costs of mechanical thrombectomy using DA, SR, and *Solumbra* techniques in patients with AIS-LVO through a rapid review.

Methods: A rapid review was conducted following the PRISMA framework. Literature searches were performed in PubMed, Scopus, ScienceDirect, and Cochrane Library using the keywords "acute ischemic stroke," "mechanical thrombectomy," "direct aspiration," "stent retriever," "*Solumbra*," and "cost." Inclusion criteria comprised studies published within the last ten years that compared MT techniques and reported economic outcomes. Extracted data included study characteristics and cost outcomes, namely total costs, direct medical costs, and indirect costs.

Results: Nine studies met the inclusion criteria. The lowest mean total mechanical thrombectomy cost was observed in the stent retriever (SR) technique (IDR 127.952.353,05), followed by direct aspiration (DA) (IDR 130.308.847,01), while the *Solumbra* technique had the highest cost (IDR 329.470.646,97). The lowest direct medical cost was reported for DA (IDR 53.914.761,32), compared with SR (IDR 114.258.879,64) and *Solumbra* (IDR 144,414,207.24). Indirect costs were reported in only one study, with the highest values in the *Solumbra* technique and the lowest in DA.

Conclusion: There are cost differences among mechanical thrombectomy techniques for AIS-LVO. Stent retriever showed the lowest mean total cost, while *Solumbra* had the highest, and direct aspiration demonstrated the lowest mean direct medical cost.

Keywords: acute ischemic stroke, mechanical thrombectomy, direct aspiration, stent retriever, *Solumbra*, cost