ONE-YEAR EFFICACY OF OLIPUDASE ALFA IN PATIENTS WITH ACID SPHINGOMYELINASE DEFICIENCY: A SYSTEMATIC REVIEW AND META-ANALYSIS

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INTRODUCTION

Acid sphingomyelinase deficiency (ASMD), or **Niemann–Pick disease types A, B, and A/B**, is a **rare lysosomal storage disorder caused by SMPD1 mutations**. Clinical forms range from **severe neurovisceral (type A)** to **chronic visceral (type B**), mainly affecting the **liver**, **spleen**, and **lungs**. Until 2022, treatment was limited to supportive care. The approval of olipudase alfa for the non-central nervous system (CNS) manifestations of ASMD marked a major advance, with trials showing improvements in organ volumes and lung function. This meta-analysis evaluates the broader clinical impact of olipudase alfa in ASMD.

OBJECTIVES

To evaluate, through meta-analysis, the efficacy of olipudase alfa in patients with ASMD types B and A/B, considering functional and volumetric features relevant to disease progression.

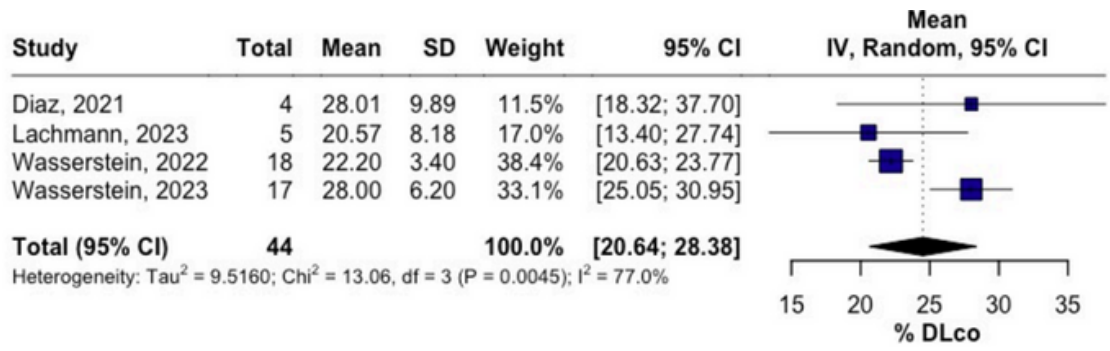
METHODS

A systematic search of Cochrane, PubMed, and Embase identified RCTs and cohort studies on olipudase alfa in patients with ASMD. Primary outcomes included mean change in %DLco, %Liver volume, and %Spleen volume; other secondary outcomes were also assessed. Study selection followed PRISMA guidelines, and statistical analyses were conducted using R software. The study was registered in PROSPERO CRD420251032281.

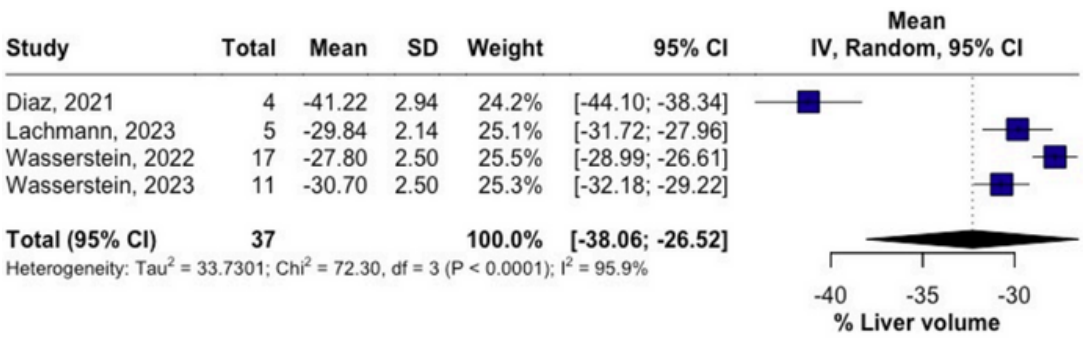
RESULTS

Three studies (One RCT) encompassing **46 patients** were **included**. Follow-up duration ranged from **1 to 6.5 years**. All patients received olipudase alfa; only one study included a placebo group.

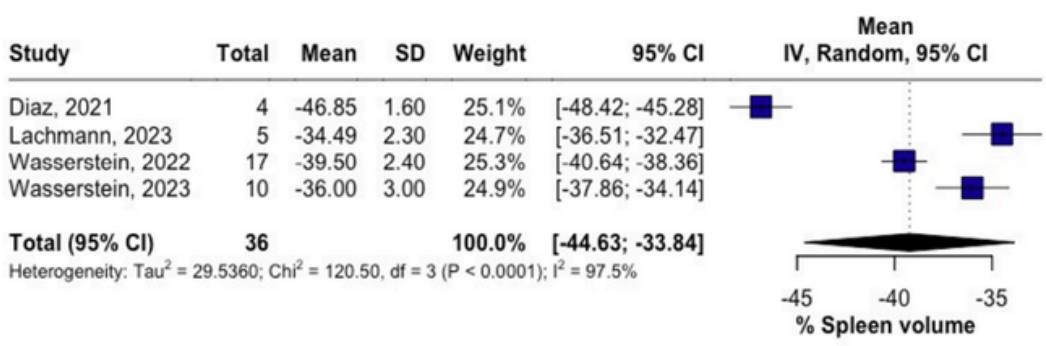
- **DLco** → increase of 24.52% (95% CI: 20.64 to 28.38; I^2 = 77%) after 1 year:



- **liver volume** → reduction of 32.29% (95% CI: −38.06 to −26.52; I^2 = 95.9%) after 1 year:



- **spleen volume** → reduction of 39.23% (95% CI: –44.63 to –33.84; I^2 = 97.5%) after 1 year:



CONCLUSION

The olipudase alfa demonstrates **substantial clinical benefits in ASMD**, **significantly improving lung function** and **reducing organomegaly**. Further studies are needed to confirm long-term safety and efficacy.

REFERENCES