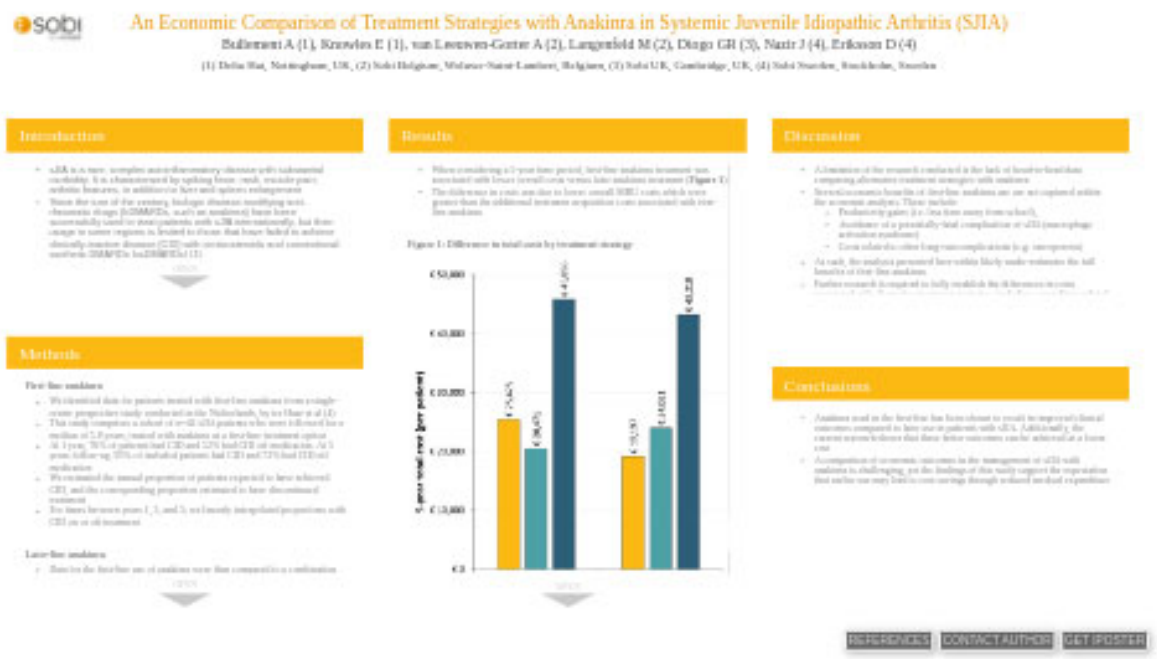
An Economic Comparison of Treatment Strategies with Anakinra in Systemic Juvenile Idiopathic Arthritis (SJIA)



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INTRODUCTION

- sJIA is a rare, complex autoinflammatory disease with substantial morbidity. It is characterized by spiking fever, rash, muscle pain, arthritic features, in addition to liver and spleen enlargement
- Since the turn of the century, biologic disease-modifying anti-rheumatic drugs (bDMARDs, such as anakinra) have been successfully used to treat patients with sJIA internationally, but their usage in some regions is limited to those that have failed to achieve clinically-inactive disease (CID) with corticosteroids and conventional synthetic DMARDs (csDMARDs) (1)
- Delayed access to biologic therapies may impede the ability to achieve long-term remission (2). This is due to the belief that a 'window of opportunity' exists in the course of sJIA during which biologic therapy may be used to successfully achieve long-term remission
- Use of anakinra in the first line leads to better clinical outcomes, and is advocated in clinical guidelines (3)
- However, the longer-term costs for a first-line treatment strategy have not yet been established
- Quantifying the differences in the costs for each strategy is essential to inform evidence-based decision making related to both cost offsets and health benefits
- This study aims to compare the costs of the beneficial early treatment (first-line anakinra) versus later treatment with anakinra in patients with sJIA

METHODS

First-line anakinra

- We identified data for patients treated with first-line anakinra from a single-centre prospective study conducted in the Netherlands, by ter Haar et al (4)
- This study comprises a cohort of n=42 sJIA patients who were followed for a median of 5.8 years, treated with anakinra as a first-line treatment option
- At 1 year, 76% of patients had CID and 52% had CID off medication. At 5 years follow-up, 95% of included patients had CID and 72% had CID off medication
- We estimated the annual proportion of patients expected to have achieved CID, and the corresponding proportion estimated to have discontinued treatment
- For times between years 1, 3, and 5; we linearly interpolated proportions with CID on or off treatment

Later-line anakinra

- Data for the first-line use of anakinra were then compared to a combination of published clinical trials and economic evaluation information, as well as clinical expert input to facilitate a comparison to later-line anakinra (i.e. following corticosteroids ± csDMARDs)
- We estimated the proportion of patients expected to achieve remission, on and off active treatment, based on the following key data:
  - 25.5% assumed monocyclic (5), of which approximately 30% were anticipated to achieve remission with corticosteroids alone within 6 weeks of initiation
  - A further ~20% achieve remission with csDMARDs within 24 weeks (6)
  - Patients with non-monocyclic course were assumed unable to achieve CID with corticosteroids ± csDMARDs
  - 50% of all remaining monocyclic + 50% of chronic patients were assumed to achieve CID with first biologic (6)
  - Subsequent bDMARD use (e.g. tocilizumab following anakinra or vice versa) assumed to have same probability of achieving CID
  - 0.54% probability of disease recurrence per week (7)
  - Discontinuation rates calibrated based on information above, combined with assumption from NICE TA238 (8) that ~12.6% of patients will discontinue bDMARD treatment annually

Unit costs

- We identified unit costs for treatment acquisition and key medical resource use (MRU) items
- Treatment acquisition costs were taken from Dutch reference prices (9); whereas MRU costs were taken from the Institute for Medical Technology Assessment (iMTA) costing tool (10)
- MRU items were included in the analysis: outpatient rheumatology visits; outpatient hematology visits; GP visits; and hospitalizations

Medical resource use frequencies

- Based on the included MRU, frequencies were assigned based on whether or not patients had CID, and if in a CID state, if patients were still receiving active treatment
- For patients that have not achieved CID, it was assumed 1 outpatient rheumatology and 1 outpatient hematology visit would be required each month. In addition, an average of 20.8 GP visits were estimated per year, and 22.1 hospitalizations (NICE TA238, 8)
- For patients with CID but still receiving active treatment, it was assumed that 1 outpatient rheumatology appointment would be required every 3 months, and 3.5 GP visits would be needed each year (NICE TA238, 8)
- For patients with CID with no active treatment, it was assumed that an outpatient rheumatology appointment would be needed every 3 months (but no GP visits were costed due to no active treatment being given)

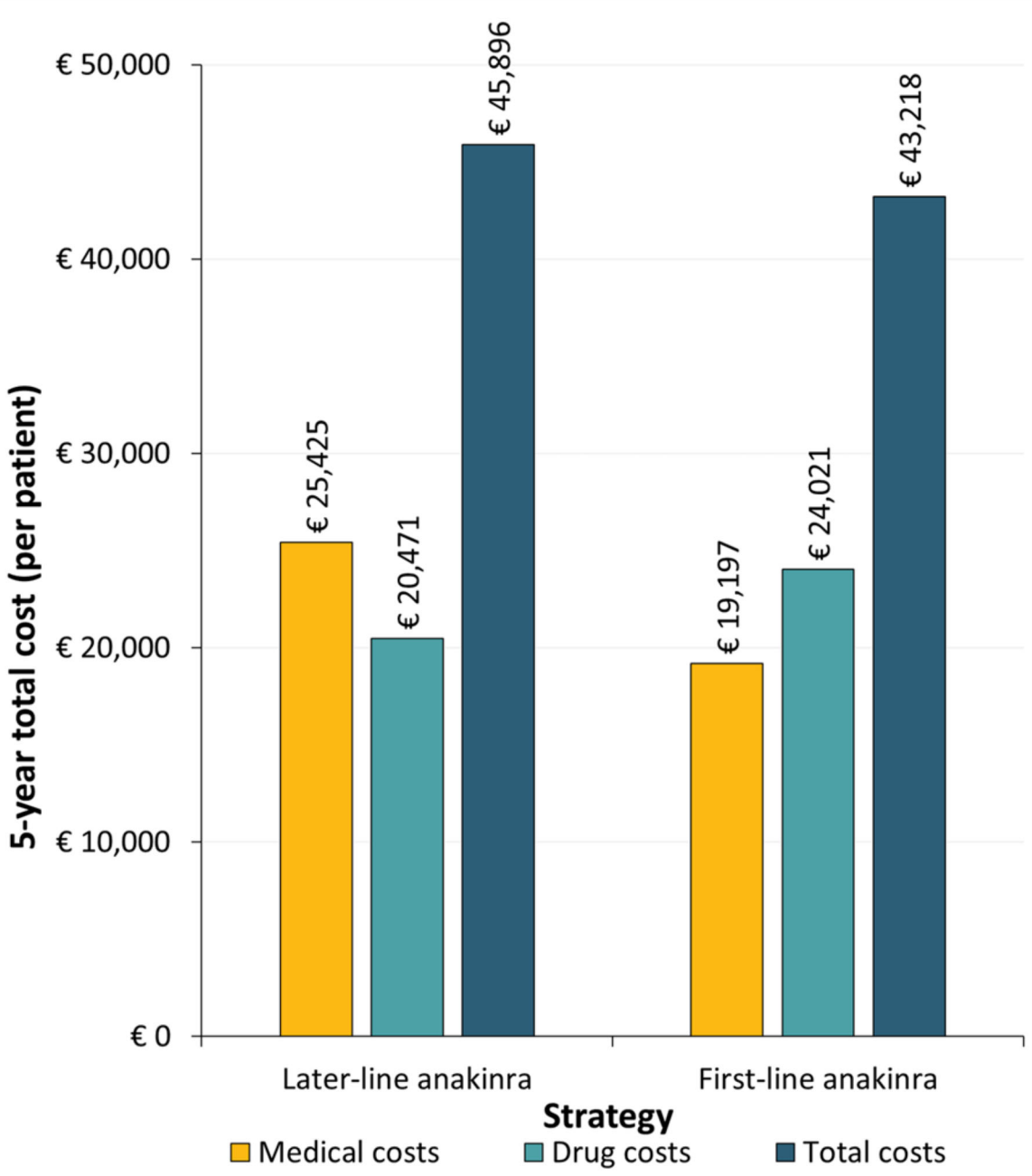
Outcomes

- Total costs were calculated over a 5-year horizon and compared between strategies. Costs were also considered separately based on their component parts (i.e. costs related to drug acquisition versus costs related to MRU)

RESULTS

- When considering a 5-year time period, first-line anakinra treatment was associated with lower overall costs versus later anakinra treatment (**Figure 1**)
- The difference in costs was due to lower overall MRU costs which were greater than the additional treatment acquisition costs associated with first-line anakinra

Figure 1: Difference in total costs by treatment strategy



DISCUSSION

- A limitation of the research conducted is the lack of head-to-head data comparing alternative treatment strategies with anakinra
- Several economic benefits of first-line anakinra use are not captured within the economic analysis. These include:
  - Productivity gains (i.e. less time away from school),
  - Avoidance of a potentially-fatal complication of sJIA (macrophage activation syndrome)
  - Costs related to other long-run complications (e.g. osteoporosis)
- As such, the analysis presented here within likely under-estimates the full benefits of first-line anakinra
- Further research is required to fully establish the differences in costs associated with alternative treatment strategies, including expenditure related to the avoidance of additional downstream costs, such as steroid-related complications, osteoarthritis, and macrophage activation syndrome

CONCLUSIONS

- Anakinra used in the first-line has been shown to result in improved clinical outcomes compared to later use in patients with sJIA. Additionally, the current research shows that these better outcomes can be achieved at a lower cost
- A comparison of economic outcomes in the management of sJIA with anakinra is challenging, yet the findings of this study support the expectation that earlier use may lead to cost savings through reduced medical expenditure

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