















Similarly, when the capacity of each batch of triage or the carrying capacity of the transport vehicle increases, the average gap percentage also decreases, indicating that the increase in the capacity of each batch of triage or the carrying capacity of the transport vehicle will improve the performance of the algorithm. The above two graphs show that the TS-A algorithm proposed herein has a better solution and better performance for the situation where the number of wounded is larger and the carrying capacity is stronger.

## 6. Conclusions

For the wounded triage, transport and cooperative scheduling problem of emergency surgery in urban emergency rescue, this study adopts a supply chain-like processing method to realize the collaborative scheduling of each rescue link. It mainly considers the collaborative scheduling problem of triage, transport and surgery under the constraint factors such as the different time when the wounded arrive at the triage field and the different transport capacity of the transport vehicles. The research goal is to minimize the whole rescue time span of different batches of wounded in the rescue process; it establishes a mathematical model to arrange batches of wounded according to the capacity of the triage field or the transport capacity of the transport vehicle, analyzes the impact of batches on the whole process time, and gives the nature of the problem in general and special cases.

In order to evaluate the performance of the TS-A algorithm, this study finally gives a two-stage algorithm TS-A and constructs the lower bound of the problem domain under the ideal state. The simulation experiment shows that the TS-A algorithm proposed herein is superior to the other two algorithms mentioned in references. At the same time, for the case of a large number of wounded and a large rescue vehicle capacity, the experiment can obtain better results, which shows that the algorithm can handle large-scale collaborative scheduling problems.

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## Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

## Conflicts of Interest

The authors declare that they have no conflicts of interest.

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