Does a single bolus thrombolytic reduce door to needle time in a district general hospital?

V Leah, C Clark, K Doyle, T J Coats

Methods: Firstly, an observational study was performed to compare the time taken to prepare standard thrombolytic therapy with Tenecteplase. Secondly, door to needle times were compared before and after the introduction of Tenecteplase. The study was powered to be 80% sure of finding a change of 10% in the number of patients receiving thrombolysis in 30 minutes door to needle time.

Results: Tenecteplase takes 10.5 minutes less time to prepare than standard treatment (p value <0.001). After the introduction of Tenecteplase the percentage of patients receiving thrombolysis in 30 minutes increased from 58% to 76% (p value <0.01).

Conclusion: Tenecteplase is quicker to prepare than standard therapy, resulting in a significant improvement in performance against the national service framework target.

Abbreviations: AMI, acute myocardial infarction; STEMI, ST elevation acute myocardial infarction; TNK, Tenecteplase
RESULTS

During the first phase 38 patients received TNK and 30 conventional treatment. The difference in preparation time can clearly be seen (fig 2). In this study TNK took 10.5 minutes less to prepare than standard therapy. The difference is so great and the confidence intervals so small that statistical analysis is not necessary to see that this is a highly significant difference. (Using the Wilcoxon rank sum test the p value is $<0.001$).

In the second study 78 consecutive patients were included, 40 before and 38 after the introduction of TNK. Figure 3 shows the percentage of patients receiving TNK in 10 minute time intervals. More patients receive thrombolysis within the first half hour with TNK, probably indicating that in this group preparation time is an important determinant of door to needle time. While the numbers are quite small it would appear that when there are longer delays, the introduction of TNK had little effect, suggesting that there are other factors affecting the door to needle time in these patients.

From the cumulative data (fig 4) it can be seen that with standard therapy the NSF target of 75% of patients thrombolysed was met in 40–50 minutes. After the introduction of TNK this target was met in 20–29 minutes. TNK increased the percentage of patients receiving thrombolysis within 30 minutes of presentation from 58% to 76%. This difference was significant (p<0.01).

DISCUSSION

While this study has demonstrated a statistically significant reduction in door to needle time with the introduction of TNK, it would be difficult to prove a 10.5 minute reduction resulted in a clinically significant difference terms of patient survival. No cost-benefit analysis was carried out in this study. However, the current pricing of the drug (about £500 per dose compared with £80 per dose for streptokinase and £430 per dose for TPA) would mean an increase in pharmacy costs if TNK was used for all patients.

It could be hypothesised that for patients’ presenting late, with several hours from onset of symptoms to presentation, the shape of the Boersma curve (fig 1) means that a 10.5 minute reduction in door to needle time would offer little clinical benefit. Conversely, for patients’ presenting early (less than three hours from the onset of symptoms) a 10.5 minute reduction in door to needle time may make a clinically significant difference in terms of survival. So the benefit gained from the introduction of TNK is likely to depend on the pain to needle time of the local population.
Individual trusts will have to make a judgement on whether the increase in cost attributable to the introduction of TNK is justified either in terms of clinical benefit or “administrative benefit” of improving performance against the NSF targets. Our own trust has made the decision to use TNK for: (1) all patients presenting within three hours from the onset of symptoms, (2) all patients with anterior ST elevation, and (3) all patients who have received streptokinase ever before. Inferior ST elevation presenting after three hours from the onset of symptoms in a patient who has not previously received streptokinase will continue to be treated with streptokinase. This protocol means that, from existing MINAP data, we can predict that about 50% of future patients will receive TNK.

The answer to our initial question seems to be that the introduction of TNK can give a statistically significant improvement in performance against national “door to needle” targets. This may improve a trust’s “league table” position, but may not necessarily be cost effective in terms of clinical benefit to the patients.

References
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