

Comparison of medical resources, costs, and health utilities among patients with CHD and impaired glucose tolerance in the Acarbose Cardiovascular Evaluation Trial (ACE)

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Background and aims: ACE assessed the effects of acarbose, an α -glucosidase inhibitor, in 6,522 patients with CHD and impaired glucose tolerance from 176 hospital outpatient clinics in China. This randomized, double-blind, placebo-controlled, phase-4 trial with a five year median follow-up showed acarbose did not reduce the risk of major adverse cardiovascular events, but reduced the incidence of diabetes by 18% ($p=0.005$). We aimed to compare medical resource use, costs and health utilities between treatment arms.

Materials and methods: Medical resource use data were collected throughout the trial. Hospitalisations, medications and outpatient visits were valued using Chinese costs from, respectively, the China Health and Family Planning Statistical Yearbook (2016), the Beijing Medicine Sunshine Purchase Platform, and published studies. Medication use is represented as drug days, with all cardiovascular and diabetes drugs summed across the follow-up period for each patient. Health utilities were measured using the Euro-QoL-5-Dimension three level (EQ-5D-3L) questionnaire. An available-case analysis was performed using regression analyses (hierarchical generalized linear models) to compare resource use, costs, and health utilities accounting for between-site variation. Costs were discounted at 3% per annum.

Results: There were no significant differences in hospitalisations, inpatient days, outpatient visits or drug days between treatment arms. However, mean (standard error) diabetes drug days per patient (excluding study drug), as part of total drug days, were significantly lower in the acarbose group compared with the placebo group (91 ± 6.08 vs. 118 ± 6.99 , $p=0.04$). Costs over the trial period for inpatient care, outpatient care, medications and total costs (excluding study drug) did not differ significantly between groups. On average, the study drug (acarbose) cost ¥6,594 (€857, 1241 drug days) per patient during the trial follow-up period. Total costs per patient for the acarbose group were significantly higher than for the placebo group (Table). Health utilities were similar at baseline in the acarbose and placebo groups (0.94 ± 0.002 vs. 0.94 ± 0.002) indicating a trial population with few health problems. No significant between group differences in health utilities were detected during the trial ($p=0.42$).

Conclusion: Total costs during the follow-up period were significantly higher in the acarbose arm once the study drug costs were added. Future research will explore the impact of acarbose on resource use, costs and quality adjusted survival over the lifetime horizon.

Comparing Resource Use and Costs across Treatment Groups (available case analysis)

Resource Use/Cost (Chinese Yuan 2017)*	Acarbose n/Mean (SE)		Placebo n/Mean (SE)		Difference Mean (SE)	P-value*
Hospitalisations (n)	3,272	0.5 (0.02)	3,250	0.4 (0.02)	0.02 (0.02)	0.40
Inpatient Days (n)	3,226	4.7 (0.24)	3,222	4.7 (0.22)	-0.01 (0.32)	0.54
Outpatient Care Visits (n)	3,250	30.2 (0.74)	3,231	29.8 (0.76)	0.36 (1.06)	0.44
Total Drug Days excluding study drug (n)	3,260	5,025 (64.58)	3,237	4,966 (65.27)	59 (91.81)	0.14
Inpatient Care Costs	3,272	4,878 (242.48)	3,250	4,897 (244.64)	-19 (330.64)	0.57
Outpatient Care Costs	3,250	10,052 (244.23)	3,231	9,920 (251.09)	132 (350.26)	0.72
Total Medication Costs excluding study drug	3,260	10,673 (210.34)	3,237	10,404 (186.77)	269 (281.42)	0.47
Acarbose Costs	3,272	6,594 (75.34)	3,250	0 (0)	6,594 (75.34)	N/A
Total Costs excluding study drug	3,249	23,011 (444.95)	3,231	22,806 (443.01)	205 (627.90)	0.82
Total Costs	3,247	28,524 (492.36)	3,231	22,806 (443.01)	5,718 (662.53)	<0.01

*P-value of treatment effect variable in GLMM model with log link function, log of follow-up as an offset variable and a negative binomial distribution for resource use, and gamma distribution for costs. * ¥1 = US\$0.16; ¥1 = €0.13. N/A not applicable.

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