It is well known that the approximate Bayesian computation (ABC) algorithm based on Markov chain Monte Carlo suffers from sensitivity to the choice of starting values, inefficiency and a low acceptance rate. To overcome these problems, this study develops the generalized Multiple-Point (GMP) algorithm for ABC. GMP is an extension of the Multiple-Point Metropolis algorithm, which generates multiple dependent proposals. GMP selects the candidate for the next step among the proposals on the basis of a weighting function that can be arbitrarily chosen. Furthermore, we can have flexibility in choosing the type of proposal distribution. Using simulated data in a number of simulation studies, it is demonstrated that GMP substantially improves the ABC algorithm with respect to the observed problems. A real-life example is also presented using the exchange rate data.