Aim: Although important, second phase insulin secretion (2nd ISEC) is less discussed and often overlooked partly because the difficulty in measuring it. To accurately quantify 2nd ISEC, c-peptide measurement and a special mathematical method-deconvolution are both needed. In this study, there are two goals: first, to validate the 2nd ISEC derived from the oral glucose tolerance test (OGTT), i.e. $\Phi_s$, against the 2nd ISEC derived from the low dose graded glucose infusion (LDGGI) which is regarded as gold standard; second, to evaluate whether to use deconvolution in calculating 2nd ISEC with LDDGI will make a difference. Methods: Fourteen subjects (3 with normal glucose tolerance, 8 with pre-diabetes and 3 with diabetes) were enrolled. They received both 180 min OGTT and 200 min LDGGI proposed by Polonsky et al. Three different 2nd ISEC were measured. First, $\Phi_s$ measured from OGTT. Second, 2nd ISEC measured by insulin without deconvolution (2nd ISEC-IN) and, third, by c-peptide with deconvolution (2nd ISEC-CP). Results: $\Phi_s$ was significantly related to 2nd ISEC-DE ($r = 0.867$, $p = 0.000$) and to 2nd ISEC-IN ($r = 0.792$, $p = 0.002$). In the same time, the correlation between 2nd ISEC-IN and 2nd ISEC-CP was also significant ($r = 0.637$, $p = 0.019$). Conclusion: Our results showed that $\Phi_s$ derived from OGTT could be reliable a measurement for 2nd ISEC. Whether to use deconvolution only has minimal effect on the measurement of 2nd ISEC.