Organic cation transporter 1 (OCT1), which is thought to be primarily expressed in the sinusoidal membranes of hepatocytes, has been proposed to be involved in the uptake of a wide variety of organic cations including drugs, toxins, and neurotransmitters into the hepatocytes. In this study, we searched for genetic variations in the SLC22A1 gene encoding OCT1 by sequencing all the exons and their flanking regions of this gene for 204 Japanese arrhythmic patients. Twenty-four genetic variations, including ten novel ones, were found. The novel variations were as follows: -94C>A in the 5'-untranslated region (A of the translation start codon is numbered +1 in the cDNA sequence), 350C>T, IVS1-35T>C, IVS2+120G>T, IVS2-164C>T, 561G>A, IVS6+75C>G, IVS8+108A>G, IVS8-28G>C, and 1671_1673delATG. Among them, 350C>T, which was found at a frequency of 0.005, resulted in the amino acid substitution Pro117Leu and is located in the large extracellular loop between transmembrane domains 1 and 2. 561G>A with a frequency of 0.007 resulted in the synonymous alteration Ala187Ala. Also, we detected the five previously reported nonsynonymous variations, 123C>G (Phe41Leu), 480C>G (Phe160Leu), 848C>T (Pro283Leu), 1022C>T (Pro341Leu), and 1222A>G (Met408Val). The present study would be useful for investigating possible correlations between genotypes and phenotypes, such as responsiveness to drug therapy and sensitivity to xenobiotics.