#267 - Clinical Study / Posters

Female Patients Of Different Genotypes From A118G Polymorphism In OPRM1 Gene Caused Significant Difference Of Morphine Consumption For Postoperative Pain Control After Total Knee Replacement

Orthopaedics / Knee & Lower Leg / Miscellaneous

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Background
Women were usually supposed to be more sensitive to pain even without relevant studies regarding the impact of gender on the required amount of analgesic for pain relief. However, pain perception is subjective, the self-reported pain degree therefore becomes a common method for pain assessment. Therefore, it is difficult to recognize the difference of allodynia and hyperalgesia between women and men. Although the A118G polymorphism of OPRM1 (mu1-opioid receptor gene) were commonly reported to cause a modulation of nociception. Limited literatures provided genetic information for addressing the relationship between pharmacodynamics of opioid and gender.

Objectives
We intended to investigate the impact of gender on the morphine consumption for postoperative pain control after total knee replacement (TKR) by analyzing A118G polymorphism of OPRM1 (mu1-opioid receptor gene).

Study Design & Methods
We chose the total knee replacement as a standardized procedure that provoked similar degree of pain postoperatively on account of the accordance of surgical steps among different orthopaedic surgeons. The degree of pain was reported by the patients according to the visual analogue scale (VAS). The patients were instructed to maintain a VAS pain score no more than 3 by utilizing the patient controlled analgesic (PCA) pump. The amount of morphine consumption was recorded and calculated by the PCA machine. Pain scores were recorded at 30-min intervals in the post-anaesthesia care unit and thereafter assessed at 3, 6, 12, 24, 36, 48 and 72 hours after the completion of the operation.
The A118G polymorphism were determined by ABI PRISM 310 Genetic Analyser. The one-way analysis of variance was utilized to test the difference of genders and their genotypes in addition to the demographic parameters. The interaction of genotypes and sex was testified by the multivariate regression analysis.

Results
For female patients in group GG consumed significantly more morphine (22.9±11.8 mg) than groups AA (15.0±6.4mg) and AG (14.5±7.3 mg) not only in the initial 24 hours but also in 48 hrs following operations (GG, 40.8±26.2 mg; AA, 24.4±14.8 mg; AG, 24.6± 12.6 mg). However, no significant differences of consumed morphine or demanded doses were disclosed among three genotypes of male patients.

Conclusions

The A118G polymorphism in OPRM1 gene caused significant difference of morphine consumption in female patients for postoperative pain control that was contributed by a genotype-by-sex interaction pattern. Only the female patients with a mutant homozygous genotype (GG) had a significantly more morphine consumption in patient-controlled analgesia after total knee replacements.