Among women with substantial peritraumatic distress after minor motor vehicle collision (MVC), the presence of one or more G alleles at OPRM1 A118G is protective against developing persistent moderate or severe pain

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INTRODUCTION

Stress exposure causes opioid release.[1]

μ-opioid receptor (MOR) agonists released at the time of stress exposure produce a bimodal response: initial analgesia followed by persistent hyperalgesia.[e.g.2,3]

European Americans (EAs) with one or more G alleles at the well-studied MOR genetic variant A118G (AG/GG) have been shown to have a reduced response to opioids.[4]

In a previous study, EA women sexual assault survivors with a AG/GG genotype experienced reduced pain six weeks after assault.[5]

HYPOTHESES

(1) EA women with a AG/GG genotype will be less likely to have moderate or severe pain six weeks after motor vehicle collision (MVC).

(2) The effect will be most pronounced among women with substantial peritraumatic distress. (Hypothesized because these women are most comparable to our previous sexual assault study participants and because these women may be expected to have the greatest peritraumatic opioid release.)

METHODS

EA women ≥18 years of age presenting to one of eight emergency departments (EDs) (Figure 1) within 24 hours of MVC who did not have fracture or require hospital admission were enrolled. ED assessment included evaluation for peritraumatic distress (Peritraumatic Distress Scale score ≥23). Six week telephone follow-up evaluation included assessment for MSP during the past week (average pain score ≥4 on 0-10 NRS). Moderate Severe Pain was assessed using multivariate log-binomial models adjusted for age, education, and study site.

TABLE 1. Study characteristics

Characteristic	All Women	Women with Peritraumatic Distress	Women without Peritraumatic Distress
n (%)	563	256	307
Mean age (yrs)	35.4 (± 13.3)	33.3 (± 13)	37.12 (±13.3)
Education (n, %)			
≤ HS	115 (20)	65 (25.4)	52 (16.9)
some college	172 (29.9)	86 (33.6)	92 (30)
≥ college	252 (43.8)	91 (35.6)	163 (53)
Income, n (%)			
<20K	84 (14.6)	50 (19.5)	32 (10.4)
20K to 40K	115 (20)	47 (18.4)	74 (24.1)
40K to 80K	178 (30.9)	86 (33.6)	100 (32.6)
>80K	139 (24.1)	45 (17.6)	101 (33)
Collision type, n (%)			
Front end	262 (45.6)	135 (52.7)	126 (41)
Rear end	206 (35.8)	71 (27.7)	140 (45.6)
Other	118 (20.5)	50 (19.5)	41 (13.3)
Relationship status, n (%)			
not in a serious relationship	178 (31)	78 (30.5)	100 (32.6)
in a serious relationship	171 (29.8)	86 (33.6)	87 (28.3)
married	217 (37.7)	89 (34.8)	120 (39)
Initial pain score, mean (SD)	5.7 (2.4)	6.4 (2.3)	5.2 (2.4)
6wk pain score, mean (SD)	4.0 (2.8)	4.5 (2.8)	3.7 (2.7)
Genotype, n (%)			
AA	432 (76.7)	191 (74.6)	241 (78.5)
AG	122 (21.6)	62 (24.2)	60 (19.5)
GG	9 (1.6)	3 (1.2)	6 (1.9)

FIGURE 1. Project CRASH study network

TABLE 2. Relative risk of developing 6 week moderate severe pain following MVC with AG/GG genotype at A118G (rs1799971) of the **μ**-opioid receptor

Population	RR (95% CI)	P Value
All women (n = 563)	**0.85 (0.7, 1.03)**	**0.090**
Women With Peritraumatic Distress (n = 256)	**0.74 (0.58, 0.96)**	**0.014**
Women Without Peritraumatic Distress (n = 307)	**1.01 (0.75, 1.35)**	**0.95**

Adjusted for age, education, ED site

RESULTS

Characteristics of study participants are shown in Table 1.

As shown in Table 2, the AG/GG genotype (131/563 (23%) of enrolled women) was not significantly protective against MSP among all women (RR (95% CI): 0.85 (0.70, 1.03), p =.090), but was protective against MSP among women with initial peritraumatic distress (RR (95% CI): 0.74 (0.58, 0.96), p =.014). This association remained when women who received opioids in the ED were excluded.

CONCLUSIONS

Females with peritraumatic distress and AG/GG alleles in the mu-opioid receptor are less likely to experience moderate severe pain 6 weeks following MVC.

Further studies that evaluate the influence of opioid hyperalgesia on pain persistence after MVC are needed.

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