

Exploring the relationship between docetaxel-induced peripheral neuropathy and quality of life in women with breast cancer

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Background

Docetaxel is benefit breast cancer survival demonstrated by numerous randomized trials (Peto et al., 2012). Docetaxel-induced peripheral neuropathy (DIPN) is one of side effects which is not easy to be aware and negatively influences women's physical, psychological, social status and quality of life (QOL) (Eckhoff, Knoop, Jensen, & Ewertz, 2015; Mols, Beijers, Vreugdenhil, & van de Poll-Franse, 2014; Smith, 2013). There are many studies to survey the phenomenon of peripheral neuropathy in other countries, but no study investigates its impact on Taiwanese women with breast cancer .

Purpose

The primary purpose of this study was to investigate the distribution and relationship of peripheral neuropathy and QOL in women with breast cancer after docetaxel treatment.

Methods

This study utilized a cross-sectional design and purposive sampling. Women with breast cancer received at least one treatment with docetaxel were recruited in this study from a medical center in northern Taiwan. Instruments included subjective assessment tool- Patient Neurotoxicity Questionnaire (PNQ), object assessment tool-Total Neuropathy Score-clinical version (TNSc), and Functional Assessment for Cancer Treatment-Breast and Taxane (FACT-B & FACT-Taxane). The data were analyzed utilizing mean, standard deviation, frequency, percentage, independent-samples t test, one-way analysis of variance, Chi-square, Spearman ' s correlation, and Pearson's correlation.

Results

- The average age of 111 subjects was 50.78 years old.
- The TIPN subjective measure found sensory and motor symptoms were 67.6% and 62.2%, respectively. Nearly half of the participants were with slight symptoms but only 4.5 to 7.2% of them were with a severe degree (Table 1).
- The objective measure indicated that 82.9% had peripheral neuropathy. Moreover, two of the most common symptoms were the deterioration of sensation on pinprick and vibration tests (Table 2).
- The PNQ sensory and motor scores were significantly higher in patients undergoing docetaxel therapy compared to those done with therapy ($\chi^2=3.84$; $p=0.05$ and $\chi^2=8.65$; $p<0.01$, respectively). Women kept the exercise behavior more than three times a week with a higher TNSc score compared to those did less than two times ($F=4.70$, $p=0.01$).
- Table 3 shows a positive correlation between subjective and objective DIPN ($\rho=0.495$, $p<0.001$), a negative correlation between subjective DIPN and quality of life ($\rho=-0.552$, $p=0.001$), and then a negative correlation between objective DIPN and quality of life ($\rho=-0.407$, $p<0.001$).

Conclusion

The results of this study showed that women with breast cancer after docetaxel induced peripheral neuropathy negatively affected the QOL. Oncology nurses are expected to have skills utilizing the TIPN subjective and objective tools to early detect and to timely manage the DIPN. Therefore, the QOL in this population is able to be advanced.

The limitation of this study was that the data were only collected from women receiving docetaxel chemotherapy for breast cancer. The study did not compare the difference between docetaxel and other chemotherapy regimens. Also, the small number of included patients limits the generalizability of the results.

References

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Table 1: Distribution of the subjective assessment

PNQ subscales	n (%)
Sensory symptoms	—
Grade A-none	36 (32.4)
Grade B-mild	56 (50.5)
Grade C-moderate	11 (9.9)
Grade D-severe	8 (7.2)
Motor symptoms	—
Grade A-none	42 (37.8)
Grade B-mild	50 (45.0)
Grade C-moderate	14 (12.6)
Grade D-severe	5 (4.5)

Note: n=111

Table 2: Distribution of the objective assessment

TNSc score/ subscales	n (%)	Mean(\pm SD)
Peripheral neuropathy (range:0-15)	—	4.27 \pm 3.77
Absent (equal to 0)	19 (17.1)	—
Present (more than 1)	92 (82.9)	—
Sensory symptoms	—	0.33 \pm 0.61
Motor symptoms	—	0.18 \pm 0.45
Autonomics symptoms	—	0.81 \pm 1.01
Pin sensibility	—	1.23 \pm 1.50
Vibration sensibility	—	0.85 \pm 1.36
Strength	—	0.39 \pm 0.57
Tendon reflex	—	0.49 \pm 0.93

Note: N=111

Table 3: Correlation matrix for each subscale score

	PNQ-sensory (subjective)	PNQ-motor (subjective)	TNSc (objective)	FACT-B	FACT-Taxane
PNQ-sensory (subjective)	1.000	—	—	—	—
PNQ-motor (subjective)	$\rho=0.496^{**}$	1.000	—	—	—
TNSc (objective)	$\rho=0.495^{**}$	$\rho=0.486^{**}$	1.000	—	—
FACT-B	$\rho=-0.265^{**}$	$\rho=-0.441^{**}$	$r=-0.323$	1.000	—
FACT-Taxane	$\rho=-0.492^{**}$	$\rho=-0.552^{**}$	$r=-0.407^{**}$	$r=0.901^{**}$	1.000

Note: N=111; * $p<0.05$, ** $p<0.01$; ρ value by Spearman ' s correlation coefficient; r value by Pearson's correlation coefficient