Patterns of Chemotherapy Usage in Hospitalized Breast Cancer Patients

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Background: *Breast cancer is the leading cancer in Thai women. Systemic chemotherapy is one of the main treatment options in both adjuvant and metastatic disease. Patterns of chemotherapy usage and hospital cost data are lacking.*
Objective: *To identify overall admission rate, chemotherapy admission and hospital cost data of breast cancer patients.*
Material and Method: *Information on illness of inpatients and casualties came from hospitals nationwide and from hospital withdrawals from the three health insurance schemes in the fiscal 2010. The data included 96% of the population. The data were analyzed by age groups, regions, hospital levels and insurance schemes in breast cancer patients.*
Results: *Admissions from breast cancer occurred for 35,490 in the year 2010. Admissions for systemic chemotherapy account for 53.1% of all breast cancer admissions and accounted for 17.3% of all admissions for chemotherapy. Most of chemotherapy admissions were in tertiary care hospital level. Mean length of stay for chemotherapy in breast cancer was 2.33 days compared to 5.30 days in other cancers. Mean hospital charge in for chemotherapy for breast cancer was 13,904 THB compared to 33,693 THB for other cancers. The mean hospital charge three insurance schemes groups: government welfare, social welfare and universal coverage were 33,096, 19,932 and 9,599 THB, respectively.*
Conclusion: *Admission rate for chemotherapy in breast cancer was not high. The cost of chemotherapy in each admission in breast cancer is nearly 50% lesser than chemotherapy for other cancers. Thus, generic drugs usage and outpatient administration of chemotherapy should be encouraged.*

Keywords: *Breast cancer, Breast neoplasm, Cost of illness*

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Breast cancer is the leading cancer in Thai women. It was ranked second in the year 2000 after cervical cancer and the incidence is increasing in Thailand and worldwide[1-3]. The prognosis of breast cancer is good with the possibility for cure in early stage disease[4]. Even after the disease has metastasized to distant organs, the median survival is approximately two years[5].

Treatment for breast cancer consists of locoregional treatment; surgery and radiation therapy, and systemic treatment; chemotherapy, hormonal therapy and anti-HER2 (human epidermal growth factor receptor 2) monoclonal antibody. Since 2000, there has been a major revolution for chemotherapy in breast cancer. Many chemotherapeutic agents such as taxanes, gemcitabine, vinorelbine, capecitabine and ixabepilone are now available and significantly improve the treatment outcomes[6]. Nevertheless, the cost of these novel agents are high and it is a barrier for majority of patients. In addition, some of newer drugs are not cost-effective. For example, bavacizumab, a monoclonal antibody to vascular endothelial growth factor, was found to be not cost-effective in metastatic breast cancer[7].

Only anthracyclines and taxanes, which are listed in the national drug list, can be used in a majority of Thai people who reimburse the cost of treatment from the universal coverage insurance. Other chemotherapies and targeted agents belong to non-essential drug list. Hence, these drugs are available for only government officers and some patients under social welfare insurance. Almost all chemotherapies in the

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non-essential drug list are expensive.

Systemic chemotherapy in breast cancer can be delivered as an inpatient or outpatient setting. Outpatient chemotherapy is more convenient and cost lesser. The data regarding the incidence of inpatient chemotherapy and the cost of treatment of breast cancer in each insurance group in Thailand are lacking. The authors compare the data in breast cancer with other cancers to provide some insight regarding cancer chemotherapy in Thailand.

Material and Method

Patient population

Data included inpatient Medical Expensing Forms for the fiscal year 2010 (October 1, 2009 to September 30, 2010) from the National Health Security Office (NHSO), Thailand and inpatient data from the Civil Servants Benefit System from the Comptroller General's Department and the Social Security Office.

Data received by the analyst team was checked for accuracy by looking for (a) overlapping information (b) visit dates (c) missing items (d) incorrect coding and (e) dating with the correct fiscal year.

Patients who were diagnosed with breast cancer (ICD-50) were included in the present study.

Patient demographics and clinical characteristics

Baseline characteristics of breast cancer patients including age, gender, level of hospital, region of hospital, admission rates, length of stay and hospital costs were captured from enrollment data.

Outcome measures

The present study outcomes was the percentage of admission for chemotherapy in breast cancer patients. The incidence of treatment was grouped according to age, regions and hospital levels. Length of stay in days and healthcare costs were compared between patients in three reimbursement groups; government welfare, social welfare and universal coverage. The data in breast cancer were compared with other cancers chemotherapy admissions.

Statistical analysis

The explanation of variables, tables of frequency enumeration and interrelationships were written using the SPSS program and checked before analyzing. After analyzing the data, the research team passed the primary analysis to ten medical specialists in order to check the validity of the information. Upon confirmation of validity, the data were compared to the Ministry of Public Health's Statistics Report 2010 for trend congruence as well as the hospital's mortality reporting for each age and disease group for comparison with the national Death Registration of the Registry Administration, Ministry of Interior Affairs. Ethics approval was provided by Ethic Committee of Medicine Faculty, Khon Kaen University, under the respect of Helsinki Declaration.

Results

Baseline characteristics of study population are shown in Table 1. There were 35,490 breast cancer admissions. Among these, 53.1% were admitted for chemotherapy which accounts for 17.3% of all chemotherapy admissions in 2010. The rate of admission for chemotherapy was highest in the 41-60 year-old group. Most chemotherapies were delivered in the central part of Thailand including Bangkok (38.6%) followed by the Northeast (26.7%), the North (25.4%) and the South (9.3%), respectively. Most of the admissions for chemotherapy occurred in tertiary care setting which comprised of more than 50%.

Mean length of stay of breast cancer admissions for chemotherapy was 2.33 days compared to 5.30 days for other cancers. Government employee spent more time for chemotherapy with mean length of stay of 3.90 days compared to 2.33 and 2.07 days in social welfare and universal coverage group respectively. Furthermore, the mean hospital charge for chemotherapy admissions was higher in the government group compared to social welfare and universal coverage as shown in Table 2. However, both the length of stay and hospital charge for breast cancer admissions for chemotherapy were lower than other cancers as shown in Fig. 1.

Discussion

The present study provides the overview of inpatient treatment of the Thai breast cancers in the year 2010. Systemic chemotherapy was delivered in 53% of hospitalized breast cancer patients. However, it is composed of only 17% of all chemotherapy admissions. The low admission rate was due to the availability of outpatient basis delivery of chemotherapy regimen in breast cancer such as AC (anthracyclines and cyclophosphamide) regimen, single agent taxanes (paclitaxel or docetaxel) and oral capecitabine. Two-third of chemotherapy were given for patients age 41-60 years old. This corresponds with the incidence of breast cancer in Thailand based on the latest available

Table 1. Baseline characteristics of the study population

Characteristics	Number	Percentage compare to all breast cancer admissions	Percentage compare to breast cancer admissions for chemotherapy	Percentage compare to all chemotherapy admissions
All breast cancer admissions	35,490	100.0		
All admissions for chemotherapy from all causes	108,728			100.0
Breast cancer admissions for chemotherapy	18,852	53.1		17.3
Age group				
26-40	2,434		13.0	
41-60	12,501		66.3	
60 up	3,896		20.7	
Region				
Central	7,280		38.6	
Northeast	5,040		26.7	
North	4,789		25.4	
South	1,229		9.3	
Level of hospital				
Primary care	244		1.3	
Secondary care	6,220		33.0	
Tertiary care	9,864		52.3	
Private	2,524		13.4	
Insurance group				
Government welfare	2,248		12.0	
Social welfare	2,743		14.5	
Universal coverage	13,861		73.5	

Table 2. Mean length of stay and mean hospital charge for breast cancer admission for chemotherapy

Variables	All insurancegroup	Government welfare	Socialwelfare	Universalcoverage
Length of stay (days)	2.33	3.90	2.33	2.07
Mean hospital charge per admission (Baht)	13,904.79	33,096.49	19,932.49	9,599.40

data which was published in 2000[1]. The highest prevalence was observed in the age of 50-55 years old with the age-standardized incidence rate (ASR) of 65.4 per 100,000 cases per year. Mean ASR of Thai breast cancer nationwide is 20.5 per 100,000 cases per year.

The proportion of chemotherapy treatment was highest in the central part of Thailand including Bangkok, followed by in the Northeast, the North and the South, respectively which did not match with the prevalence of breast cancer in each region. Data from the cancer incidence in Thailand in the year 1999 suggested that the highest prevalence was in Bangkok, represented central part of Thailand, with the ASR of 24.3 per 100,000 cases per year. The ASR in the North, South and Northeast were 20.7, 17.2 and 13.7 per 100,000 cases per year, respectively. Chemotherapy for breast cancer was delivered at the lowest rate in the South with less than 10%. Does it because of the difference in the biology of breast cancer between each region in Thailand? Probably most of breast cancers in the south were luminal type with positive hormonal receptors which would be more suitable for hormonal treatment. Does it belong to the attitude for more conservative treatment with less use of chemotherapy of the oncologists in the South? The answers are still open for further investigations.

More than two-third of chemotherapy admissions were given for patients with universal

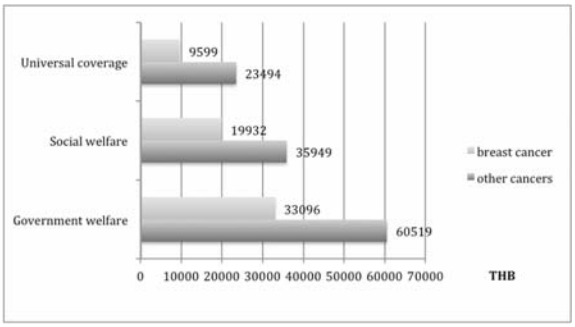

Fig. 1 Mean hospital cost of breast cancer patients among the three insurance compared with other cancers

coverage insurance group, while only 1/8 in social welfare and government welfare insurance groups. The mean hospital charge for chemotherapy in breast cancer was about a half less than chemotherapy in other cancers. The availability of the generic drugs anthracyclines and taxanes was the main reason. The mean hospital charge for universal coverage insurance was 9,599 Baht which matched with the diagnosis-related group (DRG) for chemotherapy for breast cancer which is 9,540 Baht. The length of stay and hospital cost was highest in government welfare group. Expensive novel original drugs use were the main cause.

Limitations

There are some limitations of the present study. Because of limited data, it is difficult to analyze prevalence rates of breast cancer by only admission rates. Moreover, the mortality rate and the stage of the cancer data could not be obtained.

Conclusion

Admission for chemotherapy in breast cancer is not high, only 17% of all in-patient admissions for chemotherapy. The highest rate was observed in the 41-60 year-old group and in the central region of the country. The hospital costs were extensive in those under government welfare scheme. Thus, developing outpatient chemotherapy protocol and generic drug usage should be encouraged.

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Potential conflicts of interest

None.

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รูปแบบการใช้ยาเคมีบำบัดในผู้ป่วยมะเร็งเต้านมที่เข้าพักรักษาในโรงพยาบาล

เอื้อมแข สุขประเสริฐ,จาริญญ์ จินดาประเสริฐ, โกสินทร์ วิระษร,ปณิตา ลิมปะวัฒนะ, ยุพา ถาวร พิทักษ์,

***ภูมิหลัง**: มะเร็งเต้านมเป็นมะเร็งลำดับต้นๆในผู้หญิงไทย การรักษาด้วยยาเคมีบำบัดเป็นหนึ่งในการรักษาหลักทั้งในระยะหลังผ่าตัดและระยะที่โรคมีการแพร่กระจายแล้ว ข้อมูลเกี่ยวกับรูปแบบการให้ยาเคมีบำบัดและค่ารักษาพยาบาลยังไม่เพียงพอ*

***วัตถุประสงค์**: เพื่อทราบอัตราการนอนพักรักษาในโรงพยาบาลทั้งหมดและพักรักษาเพื่อให้ยาเคมีบำบัด และค่าใช้จ่ายในการรักษามะเร็งเต้านม*

***วัสดุและวิธีการ**: ข้อมูลการเจ็บป่วยของผู้ป่วยในและผู้ที่เสียชีวิตในโรงพยาบาล มาจากข้อมูลที่โรงพยาบาลส่งเบิกจ่ายจากระบบประกันสุขภาพ 3 แหล่งในปีงบประมาณปี พ.ศ. 2553 ซึ่งครอบคลุม ร้อยละ 96 ของประชากรของประเทศ ข้อมูลที่ได้ถูกวิเคราะห์ตามกลุ่มอายุ ภูมิภาค ระดับโรงพยาบาล และสิทธิการรักษาในผู้ป่วยมะเร็งเต้านม*

***ผลการศึกษา**: ผู้ป่วยมะเร็งเต้านมเข้ารับการรักษาในโรงพยาบาล 35,490 ครั้งในปีพ.ศ. 2553 โดยการเข้ารับการรักษาเพื่อให้ยาเคมีบำบัดคิดเป็นร้อยละ 53.1 ของการรักษามะเร็งเต้านมทั้งหมด และคิดเป็นร้อยละ 17.3 ของการให้ยาเคมีบำบัดสำหรับมะเร็งทุกชนิด การให้ยาเคมีบำบัดส่วนใหญ่อยู่ในโรงพยาบาลระดับตติยภูมิ ระยะเวลาการอยู่โรงพยาบาลสำหรับการให้ยาเคมีบำบัดในผู้ป่วยมะเร็งเต้านมคือ 2.33 วันเทียบกับ 5.30 วันในมะเร็งชนิดอื่น ค่ารักษาพยาบาลเฉลี่ยสำหรับการให้ยาเคมีบำบัดในผู้ป่วยมะเร็งเต้านมคือ 13,904 บาทเทียบกับ 33,693 บาทในมะเร็งชนิดอื่น ค่ารักษาพยาบาลเฉลี่ยใน 3 ระบบประกันสุขภาพคือ ระบบสวัสดิการข้าราชการ ระบบประกันสังคม และระบบประกันสุขภาพถ้วนหน้าเท่ากับ 33,096 , 19,932 และ 9,599 บาท ตามลำดับ*

***สรุป**: อัตราการนอนพักรักษาในโรงพยาบาลเพื่อให้ยาเคมีบำบัดในผู้ป่วยมะเร็งเต้านมนั้นไม่สูง และค่ารักษาพยาบาลในแต่ละครั้งนั้นน้อยกว่าการให้ยาเคมีบำบัดสำหรับมะเร็งชนิดอื่นเกือบร้อยละ 50 ดังนั้นควรมีการสนับสนุนการใช้ยาสามัญและการให้ยาเคมีบำบัดแบบผู้ป่วยนอก*