

PP37. Pharmacoeconomic analysis of the antagonists 5-HT₃ in the control of chemotherapy-induced emesis in children

Jiménez Monteagudo M, Carrera J, León P, Gimeno J, Sierrasesúma L. Department of Pediatric Oncology, Department of Pharmacy, Clínica Universitaria, School of Medicine, University of Navarra, Spain

Background: To compare the clinical efficacy and the relative cost-effectiveness ratios of therapy with ondansetron (OND) vs tropisetron (TRO) vs chlorpromazine (CFIL) + dexamethasone (DEX) in children receiving highly and moderately emetogenic chemotherapy.

Patients and Methods: Children with solid malignant tumors who were chemotherapy-naïve, were randomized in a double-blind, placebo, cross-over trial in order to be administered CHL 0,3 mg/kg and DEX 2 mg/m² intravenously (iv.) 30 min before and 6h and 12h after chemotherapy or OND 5 mg/m² i.v. 30 min before and 12h after chemotherapy or TRO 0,2 mg/kg iv. 30 min before chemotherapy as antiemetic therapy. Direct costs included drug acquisition, drug delivery, equipment used in managing vomiting, and additional nursing time costs. Indirect costs included drugs and materials used to treat persistent nausea and/or vomiting and the side effects of the antiemetics regimens.

Results: 46 patients for a total number of 302 chemotherapy cycles were evaluated. *Highly emetogenic chemotherapy.* A complete response (0 emetic episodes) for emetic episodes was achieved in 34% and 28,1% of the patients in OND and TRO groups respectively, versus 16,7% in CHL + DEX group ($p < 0.01$). There was no statistically significant differences in the clinical efficacy between OND and TRO groups. The cost per successfully treated patient (0 emetic episodes and no adverse events) was \$16 for CHL + DEX, \$18,3 for OND and \$17,8 for TRO. *Moderately emetogenic chemotherapy:* Results did not show any significant differences in the clinical efficacy between the three antiemetics regimens. The cost per successfully treated patient was \$14,8 for CHL + DEX, \$44,8 for OND and \$35,2 for TRO. A sensitivity analysis was conducted varying the drug acquisition prices and the clinical efficacy, and the conclusions did not differ.

Conclusions: OND, TRO and CHL + DEX regimen are equally cost-effective treatments for the control of acute emesis following highly emetogenic chemotherapy in children. CHL + DEX regimen is as effective as OND and TRO in the prevention of acute emesis in children receiving moderately emetogenic chemotherapy, but the costs of the antiemetic therapy with CHL + DEX regimen are lower than the costs with OND and TRO.

Jiménez Monteagudo M, Departamento de Pediatría, Hospital Santa Bárbara, C/Malagón s/n, Puertollano, Ciudad Real 13 500, Spain

PP38. Issues in developing an economic evaluation of an innovative cancer control program for the medically underserved

Jones WJ, Rodgers K, Nixon DW, Hoskins D, Wilson D, Lackland D. Hollings Cancer Center, Medical University of South Carolina, Charleston, SC, USA

Background: Cancer morbidity and mortality rates in the U. S. state of South Carolina are among the highest in the nation, and are greatest among socioeconomically disadvantaged and nonwhite (primarily African-American) citizens. The Coastal Cancer Control Program (CCCP) is an innovative five-year, \$4.5 million project designed to address the cancer prevention and control needs of military dependents and other medically underserved citizens of coastal South Carolina. The CCCP tests the hypothesis that a socially and culturally appropriate program involving education by health care professionals and follow up by trained community volunteers will improve cancer screening and risk reduction practices among traditionally medically underserved residents. The program involves a coordinated effort in early cancer detection, including mobile screening facilities, public education, primary cancer prevention interventions, and follow up care.

Methods: The economic evaluation currently being developed attempts to deal with important methodological and substantive issues, including the following:

1. Educational and mentoring efforts by unpaid volunteers (Volunteer Adjunct Researchers, or VARS), who are socially and racially representative of the communities in which they work, are central to program operations. It is hypothesized that the VARs will be more effective in bringing about healthy behaviors in the underserved than traditional health service personnel. However, there is little established knowledge on how to measure the health care cost-effectiveness of activities carried out by unpaid, nontraditional volunteers. New, innovative measures will have to be developed.
 2. Mobile screening services are to be provided to a geographically dispersed, relatively inaccessible population of traditionally underserved residents. Given this, program researchers are currently considering what format for mobile services would be most cost-effective.
 3. The target population for the CCCP primarily consists of medically underserved South Carolina residents. It will be difficult to define program success in economic terms, and to compare the cost-effectiveness of this cancer education and prevention program to those (primarily involving white middle-class populations) described in the literature.
- Results:** Currently, the authors have no results, but anticipate presenting information regarding their development and evaluation methods of analysis.
- Discussion:** The CCCP is an innovative program attempting to improve health behaviors and outcomes in a primarily African-American population that has extremely high rates of cervical, breast, prostate, colorectal and other cancers. Since this population has historically not had access to adequate cancer education and prevention, and is historically suspicious of and resistant to the efforts of "establishment" health providers, economic evaluation will have to involve correspondingly new and appropriate measures and methods. This presentation will deal with the efforts to accomplish this objective.

Jones WJ, Department of Health Administration and Policy, 408 Harborview Office Tower, Medical University of South Carolina, Charleston, SC 29425, USA

PP39. The cost of radiation treatment at two Greek radiotherapy centres

Kardamakis D¹, Salvaras N², Dimopoulos J¹

¹University of Patras Medical School, Department of Radiology, Patras, Greece; ²401 Army General Hospital, Department of Radiotherapy, Athens, Greece

Background: The objective of this study was to calculate, for the first time, the cost of radiation treatment at two Radiotherapy Departments in Greece, accommodated in General Hospitals in Athens and Patras.

Methods: The study period expanded from July 1992 to December 1993. The Departments were equipped with high-energy treatment machines (linear accelerator or cobalt unit), simulators and treatment planning computers and were appropriately staffed. The Department of Radiotherapy in Patras is located in a 700 bed Teaching Hospital, funded by both the University and the National Health System. The Department of Radiotherapy at the 401 Army Hospital of Athens is located in a 600 bed Hospital, funded by the Ministry of Defence. All patients treated were diagnosed with having either solid tumours or haematological malignancies, and received either radical or palliative radiotherapy.

Results: An average of 658 and 341 patients were treated during the study period at Patras and Army Hospital respectively. The total cost was 82,238,000 Drs for Patras Hospital and 54,225,000 Drs for Army Hospital. The cost per patient was 159,018 Drs for the Athens Department and 124,982 Drs for the Patras Department. We emphasize here that this cost is for outpatients only, excluding medication and transportation expenses.

Discussion: Despite the weaknesses of this study due mainly to absence of standard methodology, the data obtained can be used in several ways: a. Clinicians and administrators should be aware of the total cost of anticancer treatment in order to determine optimal patterns of care, b. The cost per patient was 159,018 Drs and 124,982 Drs (in 1994 prices) for the Army and the Patras Hospital respectively, The cost per patient was 21% higher for the cobalt unit due to the smaller number of patients treated. c. The staff cost accounted for 17% and 33% of the total cost for the Army and Patras

Hospital respectively. These figures were significantly lower from those published in the literature. d. The State reimburses the Hospitals with 5,130 Drs and 2,760 Drs per fraction for the linear accelerator and the cobalt unit respectively. This amount covers a small percentage of the cost, causing financial problems to radiotherapy centers in Greece.

Kardamakis D, University of Patras Medical School, Department of Radiology & Radiotherapy, 265 00 Rion Patras, Greece

PP40. Economic Analysis of cancer treatments taking QoL into consideration

Koinuma N, Ito M

Tohoku University School of Medicine, Sendai, Japan

Background: Economic recession and budget constraints increasingly determine the provision of health care services and both QoL and economic aspects seems to be indispensable to build a social consensus in the interest of securing financial resources for cancer treatment costs that are expected to balloon in the future. The purposes of this study are to clarify the relationship between the input resources and economic effects of cancer care and to attempt to combine the economic evaluation of cancer care with its QoL evaluation.

Methods: We developed a system model of prognosis of seven principal cancers and analyzed the balance of patient labor productivity and accumulated cancer treatment costs during the survival period, based on the average remaining life. We estimated the five-year survival rates of prognostic paths, the probability of the paths to follow any of the routes, and cancer treatment costs. To provide a system model most similar to the true clinical developments of cancer cases, the following conditions were assumed;

- 1) The disease progresses more rapidly in young cases than in aged.
- 2) The cancer accelerates as prognostic stages advance.
- 3) Treatment costs rise among young cases but gradually diminish with age.

The labor productivity is calculated using the age-specific wage census. Living expenses are 50% of productivity. Discount rates are set at 3% to 5%. Results are calculated according to age, route and treatment. Decline in QoL was taken into consideration as a decrease in survival years using time trade-off method (QALYs).

Results: The prognostic paths in tree structure of the system model are 50 routes in stomach, 51 in colon, 51 in rectum, 51 in lung, 52 in breast, 77 uterus and 109 in prostate cancers respectively. The cost-benefit ratios of lung(0.36), colon(0.86) and rectum(0.93) cancers are below 1, while those of other cancers are above 1. Treatment costs per QALY gradually increase as the age advances, and those of lung and colon cancers are relatively high.

Discussion: Sensitivity analysis of the cost-benefit ratio in breast cancer treatment by changing the non-resection rate showed that medical expenses change little with an increased non-resection rate. This is because reduced medical costs by increasing the non-resection rate is offset by an increase in the number of patients undergoing mastectomy after recurrence. Increased non-resection rate and decreased medical expenses did not show a linear relationship, but a critical point in the non-resection rate, providing the lowest medical cost, did exist. The economic contribution of cancer treatment is often underestimated. We can, however, define the true benefit of cancer treatment by economic analysis.

Koinuma N, 2-1, Seiryō-machi, Aoba-ku, Sendai, 980-77, Japan

PP41. Economic analysis of patients with breast cancer in a health maintenance organization

Konski A¹, Wilder L², LeSage J³

¹Dept. of Rad. Onc., Flower Hospital, Sylvania, OH, USA; ²Dept. of Economics, Bowling Green State University, Bowling Green, OH, USA;

³Dept. of Economics, University of Toledo, OH, USA

Background: Breast cancer's impact on Health Maintenance Organizations (HMO's) has increased because of increased enrollment of Medicare

patients. This study investigates patients with breast cancer in a Northwestern Ohio, USA based HMO.

Methods: Billing claims of patients with a diagnosis of breast cancer between 1990-1993 were identified from Paramount Health Plans insurance data. Paramount Health Plan is an accredited health plan in Northwest Ohio with an average enrollment of 12741 female members during the study period. Data collected from the medical record included stage at diagnosis, tumor size, method of diagnosis, type of surgery performed, treatment received, disease status, age at diagnosis, whether the patient had a previous mammogram, if they were in the insurance plan for the entire study period, mean income level, and cost measured from a payer's perspective. Average household income obtained from 1990 United States census data was used as a proxy for income. Only cost pertaining to the treatment of breast cancer were tabulated and discounted to the year of diagnosis. Regression analysis was performed with the Matlab statistical program.

Results: A total of 59 women had claims with a diagnosis of breast cancer during the study period. Of these, only 41 had the diagnosis made between 1990-1993, and of the 41 women, 30 had sufficient information in the hospital record to complete all data variables. Women diagnosed by mammography had statistically smaller cancers than if diagnosed by themselves or by a physician. Even though mammography is a covered procedure, the majority of patients were self diagnosed by feeling a lump in the breast. Patients diagnosed by themselves tended to have a lower mean income compared to mammographic diagnosis but this difference was not statistically significant. A statistically significant difference did not exist in total cost of treatment between the different types of surgery used, i.e. lumpectomy and radiation, mastectomy, and mastectomy and reconstruction. A difference, which approached statistical difference $p=0.0514$, was noted in mean income between patients undergoing mastectomy and reconstruction, \$52,690.40, and modified radical mastectomy, \$32,745.87. Results of the regression analysis will be presented.

Discussion: Although mammograms are a fully covered service in this health plan, the majority of patients had the diagnosis of breast cancer made by themselves. The cost associated with treatment as well as outcome was better in patients diagnosed by mammography. The differences in choice of surgical procedure may be related to socioeconomic status.

Konski A, Flower Hospital Radiation Oncology, 5200 Harroun Rd., Sylvania OH 43560, USA

PP42. Cost-efficacy evaluation of fludarabine phosphate in the treatment of chronic lymphocytic leukemia refractory to other therapies

Laplante S, Grenier JF

Berlex Canada Inc., Montreal, Canada

Background: The advent of purine analogs such as fludarabine phosphate (FLU) has changed the therapeutic approach of chronic lymphocytic leukemia (CLL), from palliative to curative. However, the costs associated with these medications are often perceived as high and thus, a careful evaluation is required prior to allowing their extensive use.

Methods: A cost-efficacy evaluation was conducted to compare FLU to the most common alternative treatment in Canada, i.e. cyclophosphamide-vincristine-prednisone (CVP). Efficacy data was obtained from review articles and published studies identified in MEDLINE. Costs and their structure were obtained from official tariffs and discussions with experts. As a Ministry of Health perspective was adopted, only direct medical costs were considered. Costs of treating Grade III/IV toxicity were factored into the model. In the basic scenario, 5 cycles of FLU resulted into an overall response rate of 51% - complete response (CR): 38%, partial response (PR): 13 %, survival: 3.6 years (CR), 2.8 years (PR). Whereas for CVP, the response rate was 30% (CR: 0% and PR: 30%) with a survival in responders of 1.3 years. Sensitivity analyses were performed on efficacy parameters and duration of treatment.

Results: Both alternatives appear to be highly cost-effective with cost per year of life gained (YLG) in the magnitude of CDN \$3,000-\$4,000. FLU is the best option generating savings of CDN \$476 per YLG (FLU=\$3443 YLG; CVP=\$3914/YLG). Sensitivity analyses reveal that the relationship is