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THAÍS DE AGUIAR GOUVÊA

Análise de Toxicidades Relacionadas ao Protocolo Carboplatina e Paclitaxel em Pacientes com Câncer de Ovário

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Resumo: Pacientes com câncer de ovário geralmente são acometidas por toxicidades que podem prejudicar a efetividade do tratamento oncológico. O presente trabalho teve como objetivo analisar as toxicidades apresentadas por pacientes com câncer de ovário tratadas com protocolo carboplatina e paclitaxel, buscando identificar possíveis fatores de risco associados. O estudo foi do tipo coorte, retrospectivo, envolvendo mulheres diagnosticadas com câncer de ovário, matriculadas entre 2015 e 2017 em um hospital oncológico de referência no Brasil. Por meio da análise de prontuários e receitas médicas, foram coletados dados demográficos, clínicos, farmacoterapêuticos, as toxicidades apresentadas durante o tratamento e os desfechos (redução de dose de quimioterapia, suspensão de quimioterapia e mudança de protocolo). Foram incluídas no estudo 105 pacientes. Destas, 47% apresentavam alguma comorbidade, 71% eram polimedicadas, 2% foram expostas à interação medicamentosa com o protocolo estudado, 73% apresentaram toxicidades, sendo 35% de grau $\geq$ 2. Alopecia e astenia foram as toxicidades apresentadas com maior nível de gravidade e 55% tiveram pelo menos um dos desfechos estudados, que prejudicam a efetividade do tratamento. Não se observou associação entre os desfechos e a ocorrência de toxicidades grau $\geq$ 2. O estudo foi capaz de identificar as principais toxicidades que acometeram mulheres com câncer de ovário tratadas na instituição, e tem potencial para auxiliar os profissionais da saúde na realização de medidas preventivas relacionadas à gravidade das toxicidades e aos desfechos que o tratamento com o protocolo investigado pode causar.

Palavras Chave: Câncer de Ovário; Toxicidade de Medicamentos; Carboplatina; Paclitaxel.

Abstract: Patients with ovarian cancer are usually affected by toxicities that may impair the effectiveness of cancer treatment. The present study aimed to analyze the toxicities presented by patients with ovarian cancer treated with carboplatin and paclitaxel protocol, seeking to identify possible associated risk factors. The study was a retrospective cohort study involving women diagnosed with ovarian cancer, enrolled between 2015 and 2017 in a referral hospital in Brazil. Demographic, clinical, pharmacotherapeutic, toxicities presented during treatment and outcomes (dose reduction of chemotherapy, chemotherapy withdrawal and protocol change) were collected through medical records and medical records analysis. 105 patients were included in the study. Of these, 47% had some comorbidity, 71% were polymedicated, 2% were exposed to the drug interaction with the protocol studied, 73% presented toxicities, being 35% grade> 2. Alopecia and asthenia were the toxicities presented with a higher severity level and 55% had at least one of the outcomes studied, which impairs the effectiveness of treatment. There was no association between the outcomes and the occurrence of grade 2 toxicities. The study was able to identify the main toxicities that affected women with ovarian cancer treated at the institution and has the potential to assist health professionals in carrying out preventive measures related to the severity of the toxicities and to the outcomes that treatment with the protocol investigated may cause.

Keywords: Ovarian Cancer; Drug Toxicity; Carboplatin; Paclitaxel

SUMÁRIO

INTRODUCTION

Ovarian cancer is the most difficult gynecological tumor to diagnose and has the least chance of a cure. About 75% of cancers of this organ are at an advanced stage at the time of diagnosis. Among the reasons for this outcome are the lack of clear symptoms of the disease and the absence of specific screening (Kehoe *et al*., 2015; Rizuuto *et al*., 2015). Overall, an estimated 295,414 new cases and 184,799 deaths from ovarian cancer were reported in 2018 (Bray *et al*., 2018). In Brazil, a total of 6,150 new cases of ovarian cancer per year were estimated for the 2018 and 2019 biennium, making it the eighth most frequent cancer in addition to being the eighth leading cause of cancer death among women (INCA, 2019).

Most ovarian tumors are epithelial carcinomas, but there are two other histologic types: malignant germ cell tumors and stromal tumors. With respect to epithelial cells, the cells present characteristics that are used to classify them into different types (Ferreira *et al*., 2012; Rosen, 2009). The serous type is the most common, but beyond this, there are mucinous, endometrioid and clear cell types. The tumor is termed undifferentiated when the cells do not resemble any of the four subtypes, and tends to grow and spread more rapidly (Kim *et al*., 2018; Soslow, 2008).

The treatment used will depend on the histological type of the tumor, staging of the disease and clinical and demographic factors of the patient. Two types of treatment can be performed: surgery and chemotherapy (QT) (Hennessy, Coleman, Markman, 2009). The first line of chemotherapeutic treatment for stages II-IV of this type of tumor are taxane and platinum based drugs, such as paclitaxel and carboplatin (Rosen, 2009; Vang, Shih, Kurman, 2009).

These antineoplastics cause toxicities, such as ototoxicity, peripheral neurotoxicity, hepatotoxicity, mucositis, and bone marrow suppression (McEvoy, 2016). In addition to the medications used in the protocol, cancer patients use supportive medications to control pain, nausea and other symptoms. The concomitant use of five or more drugs over a prolonged period is called polypharmacy (Ferner, Aronson, 2006; Marques *et al*., 2018), a phenomenon that is frequent in these patients. This condition increases the risk of patients being affected by drug interactions and toxicities, and may compromise therapeutic efficacy (LeBlanc *et al*., 2015; Van Leeuwen *et al*., 201).

Knowledge about possible risk factors for toxicities in cancer patients contributes to improving the practice of health professionals and ensuring the safety of patients using these

drugs. In spite of the existence of evidence from clinical trials, studies with real-life data on this subject, involving patients with ovarian cancer, are scarce.

In this context, the present study aimed to analyze the occurrence of toxicities related to the use of the carboplatin and paclitaxel protocol (carbotaxol) in patients diagnosed with ovarian cancer between the years 2015 and 2017, treated in a public hospital specializing in oncology, seeking to identify possible risk factors related to the occurrence of toxicities.

MATERIALS AND METHODS

An observational, retrospective cohort study was carried out, in which all the women had a diagnosis of adenocarcinoma-type epithelial ovarian cancer, confirmed by a histopathological report (LHP) between the years 2015 and 2017, were aged over 18 years, and treated with the carbotaxol protocol in a public hospital of reference for the treatment of gynecological tumors in Brazil. Women who had undergone previous oncologic treatment, were diagnosed with undifferentiated ovarian cancer or with distant metastases (stage IV), were excluded.

The carbotaxol protocol used in the institution is performed as follows: a) intravenous infusion on the first day (D1) of the pre-chemotherapy drugs (dexamethasone 20 mg, ondansetron 8 mg, ranitidine 50 mg and diphenhydramine 50 mg); b) intravenous infusion of chemotherapy drugs (paclitaxel 175 mg/m² and carboplatin AUC (area under the curve) 4 to 6) also in D1; c) completion of a new cycle after 21 days, until a total of six cycles have been completed (INCA, 2011). After each cycle of chemotherapy, the following therapeutic regimen is planned to prevent the occurrence of nausea and vomiting: dexamethasone 4 mg 12/12 hours (3-4 days), ondansetron 8 mg 12/12 hours (3-4 days) and metoclopramide 10 mg 6/6 hours (5 days) (INCA, 2011).

For the data collection, a form was prepared exclusively for this study. Demographic and clinical data were collected, through physical and electronic medical records analysis, during the period of hospital admission until the last cycle of the carbotaxol protocol.

The demographic data recorded were work activity, marital status, ethnicity, schooling, smoking, alcoholism and age. For the smoking variable, smokers included those who declared themselves to be former smokers, and for the variable alcoholism, those patients who registered any information on alcoholic beverage use were considered alcoholic, even though they reported a low frequency of use.

The clinical data collected were presence of comorbidities, type of comorbidity, staging of the disease, histological subtype of the tumor, QT type and number of cycles performed. The institution's electronic systems (INTRANET and ABSOLUTE®) were used to search for information on the pharmacotherapeutic data. The following were was considered as pharmacotherapeutic data: the name of the medicines used during QT treatment, the presence of co-medication (concomitant use of five or more drugs), and the use of drugs that interact pharmacologically with the carbotaxol protocol.

Firstly, accessing INTRANET sought the medical prescription prior to the first cycle until the previous to the last cycle of carbotaxol. Each prescription had a unique identification number and was imported into ABSOLUTE®. In this system, the prescriptions were analyzed and the names of the drugs of continuous use and of emergency use that were dispensed by the outpatient pharmacy of the hospital during the treatment with the protocol carbotaxol could be obtained. In this way, it was possible to identify the medicines that the patients received for treatment, and to classify them as polymedicated or not. The chemotherapeutics carboplatin and paclitaxel were not taken into account for this identification. The prescribed drugs were classified as Anatomical Therapeutic Chemical (ATC) (WHOCC, 2019).

Finally, to identify if the patient used any medication that interacted with the protocol studied, the MICROMEDEX® database was used. As a priority, we identified only medications that interacted moderately or severely with the carbotaxol protocol. In the analysis, only the drugs that were standardized in the studied unit were considered (Frame 1). Patients who received a potentially interactive drug were identified as being exposed to a drug interaction (IM).

Frame 1: Standardized medications in the hospital that interact with the carboplatin and paclitaxel protocol (carbotaxol).

Medications of the protocol carbotaxol	**Severe drug interaction**	**Moderate drug interaction**
Carboplatin	Warfarin Phenytoin	No interaction
Paclitaxel	Clopidogrel	Phenytoin
Dexamethasone	Nifedipine	Phenytoin Acetylsalicylic acid Warfarin Phenobarbital Rifampicin
Ondansetron	No interaction	No interaction

Ranitidine	Ketoconazole	Warfarin Risperidone
Diphenhydramine	No interaction	No interaction

Toxicities and outcomes (QT dose reduction, QT suspension, and protocol change) were also identified through physical and electronic records analysis. We searched these variables from the first cycle of carbotaxol up to two weeks after the last cycle. The classification of severity of toxicities was performed by health professionals in grades 1, 2 and 3, using as basis for their records the Common Criteria for Adverse Events Terminology (CTCAE) version 4.0 (NCI, 2009).

A descriptive analysis of the demographic, clinical and pharmacotherapeutic variables was performed. The chi-squared test and the relative risk calculation were used to verify the possible association between toxicities recorded in medical records with grade ≥ 2 intensity and the analyzed outcomes. Statistical significance was set at $p < 0.05$. The data were organized into spreadsheets of Microsoft Excel® software and statistical analyses were performed in the *Statistical Package for Social Science* (SPSS®) version 22.0.

The project was approved by the Ethics and Research Committee (CEP) of the institution (CAAE: 87648118.9.0000.5274). There was no need to obtain a Free and Informed Consent Term (TCLE) because this was a retrospective, non-interventional study with anonymous and aggregated data analysis, with no risks or losses imposed on the participants.

RESULTS

A total of 139 patients were eligible for the study; 30 were excluded for diagnosis in stage IV and 4 for undifferentiated diagnosis of the tumor. Finally, 105 patients were included in the analyses.

The majority of the patients had no work activity at the time of admission to the hospital, were married, non-smokers, non-alcoholics, white and had an elementary education. Regarding the clinical profile, the most prevalent histological subtype was serous, the most frequent staging was III, adjuvant chemotherapy was the most performed and most patients had no comorbidity. Among the patients presenting comorbidities, seven different types affected these women (hypertension (40%), diabetes (17%), dyslipidemia

(2%), obesity (1%), nephropathy (4%) and heart disease (1%)). Demographic and clinical profiles are presented in Table 1.

Table 1: Demographic and clinical profile of patients with ovarian cancer at an institution specializing in oncology, treated with a carboplatin and paclitaxel protocol (carbotaxol) between 2015 and 2017.

Variable	n	%
Work activity		
No	62	59
Yes	43	41
Marital status		
Single	35	34
Married	37	35
Divorced	13	12
Widow	20	19
Smoker		
No	76	72
Yes	29	28
Alcoholic		
No	93	89
Yes	12	11
Schooling		
Fundamental	56	53
High school	37	35
Higher education	11	10
Illiterate	1	1
Ethnicity		
White	57	54
Brown	38	36
Black	10	10
Histological subtype of tumor		
Serous	65	62
Mucinous	14	13
Endometrioid	9	9
Clear cell	13	12
Mixed	2	2
Papillary	2	2
Tumor staging		
I	17	16
II	14	13
III	74	71
Chemotherapy		
Neo-adjuvant	32	30
Adjuvant	64	61
Palliative	9	9
Comorbidity		

No	56	53
Yes	49	47

The median QT cycles were 6 cycles (min = 1, max = 8) and the median age was 57 years (min = 26, max = 79). The pharmacotherapeutic profile of the patients is presented in Table 2. It was observed that the majority of the patients were polymedicated and that 2% had exposure to IM with the studied protocol. The groups of drugs most prescribed by doctors were those of the digestive system and metabolism. The most commonly used drugs during the chemotherapy treatment were dexamethasone, ondansetron, dipyrone and omeprazole.

Table 2: Pharmacotherapeutic profile of patients with ovarian cancer at an institution specializing in oncology, treated with a carboplatin and paclitaxel protocol (carbotaxol) between 2015 and 2017.

Variable	**n**	**%**
Polymedication		
No	30	29
Yes	75	71
Drug interaction with carbotaxol protocol		
No	103	98
Yes	2	2
Groups of prescription drugs		
Digestive system and metabolism (A)	517	62
Nervous system (N)	213	25
Respiratory system (R)	46	5
Anti-infectives (J)	28	3
Blood and hematopoietic organs (B)	22	3
Cardiovascular system (C)	22	3
Musculoskeletal system (M)	5	1
Antineoplastic and immunomodulatory agents (L)	4	0
Antiparasitic products (P)	4	0
Medications most used by patients		
Dexamethasone (A01AC02)	98	93
Ondansetron (A04AA01)	95	90
Dipyrone (N02BB02)	86	82
Omeprazole (A02BC01)	64	61
Bromopride (A03FA04)	63	60

Metoclopramide (A03FA01)	53	50
Tramadol (N02AX02)	33	31
Codeine (N02AA59)	22	21
Loperamide (A07DA03)	21	20
Paracetamol (N02BE01)	21	20

Regarding the two patients who had exposure to IM with the carbotaxol protocol, both were taking acetylsalicylic acid (AAS) regularly, at a dose of 100 mg at lunch. Both patients were hypertensive; one of them finished the 6 cycles of treatment, without any record of toxicity and negative outcome. However, the other patient had an adverse outcome, suspension of treatment and change in the carbotaxol protocol. The medical reason for these actions was thrombocytopenia, classified as grade 2.

Regarding toxicities, the majority of patients had a medical record in at least one of the cycles (73%), and 65% of these toxicities were classified by health professionals as grade 1, 30% as grade 2 and 5% as grade 3. There were 17 types of toxicities recorded in the records (Table 3), with nausea being the most frequent toxicity. Among the grade 1 toxicities, the main ones were: nausea, asthenia and myalgia. In relation to toxicities $\geq$ grade 2, alopecia and astenia were the ones that affected the patients the most.

Table 3: Types of toxicities reported in medical records of patients with ovarian cancer at an institution specializing in oncology, treated with a carboplatin and paclitaxel protocol (carbotaxol) between 2015 and 2017.

Toxicities								
	Grade 1		**Grade 2**		**Grade 3**		**Total**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Nausea	31	18	6	13	0	0	37	35
Asthenia	24	14	6	13	2	33	32	30
Myalgia	17	10	2	4	0	0	19	18
Constipation	15	9	5	10	0	0	20	19
Alopecia	14	8	10	22	2	33	26	25
Fatigue	11	6	1	2	0	0	12	11
Diarrhea	10	6	1	2	0	0	11	10
Mucosite	9	5	1	2	0	0	10	9
Vomiting	9	5	4	9	0	0	13	12

Peripheral neuropathy	9	5	1	2	0	0	10	9
Paresthesia	8	5	4	9	1	17	13	12
Hyperemia	6	3	2	4	0	0	8	7
Plaquetopenia	4	2	1	2	0	0	5	4
Neutropenia	4	2	1	2	1	17	6	6
Lower back pain	2	1	1	2	0	0	3	3
Anemia	2	1	0	0	0	0	2	2
Arthralgia	1	1	1	2	0	0	2	2

It can be observed in Table 4, that of the total number of patients, more than half had at least one of the three outcomes. Of those who did not have a toxicity record, only 21% had any of the outcomes. In patients with grade 1 toxicity, QT suspension and protocol change occurred with the most severely affected patients. Of the patients with toxicity grade $\geq$ 2, 70% had at least one of the three outcomes, with a reduction in QT being the most frequent.

Table 4: Frequency of the outcomes of patients with ovarian cancer at an institution specializing in oncology, treated with a carboplatin and paclitaxel protocol (carbotaxol) between 2015 and 2017.

Outcome	**Toxicity not registered (n=28)**		**Toxicity grade 1 (n=77)**		**Toxicity grade $\geq$ 2 (n=37)**		**Patients studied (n=105)**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
QT dose reduction	2	7	10	13	11	30	23	22
QT Suspension	2	7	18	23	7	19	27	26
Protocol change	2	7	18	23	8	21	28	27
Total	6	21	46	59	26	70	58	55

Among the patients who had a QT dose reduction (22%), the majority reduced the paclitaxel dose (19%). The reduction by 15% was the most incidental (58%), followed by the reduction by 10% and 20%, representing, respectively, 23% and 19% of the total dose reductions of this drug. Carboplatin had its dose reduced by decreasing the AUC of patients from 5 to 4, representing 3% of total reduced QT doses. In all, four justifications for dose reductions were observed: toxicity (58%), progression of disease (32%), drop in performance status (5%) and comorbidity (5%).

Table 5 shows the results of the association tests performed. It was not possible to identify a positive association between the outcomes and the occurrence of grade ≥ 2 toxicities.

Table 5: Analysis of possible association between the outcomes and grade ≥2 toxicities of ovarian cancer patients at an institution specializing in oncology treated with a carboplatin and paclitaxel protocol (carbotaxol) between 2015 and 2017.

Outcome		Toxicity grade ≥ 2			
		Yes	**No**	**Relative Risk**	**p-value**
QT dose reduction	**Yes**	11 (10%)	11 (10%)	1.83 (IC= 0.88 - 3.82)	0.103
	No	26 (25%)	57 (54%)		
QT Suspension	**Yes**	7 (7%)	8 (8%)	1.62 (IC= 0.63 - 4.08)	0.317
	No	30 (29%)	60 (57%)		
Protocol change	**Yes**	8 (8%)	13 (12%)	1.13 (IC= 0.51 - 2.47)	0.759
	No	29 (28%)	55 (52%)		

* QT: Chemotherapy; IC: Confidence Interval

DISCUSSION

The study evidenced the main toxicities that affected ovary cancer patients treated with the carbotaxol protocol. Although it was not possible to make an association between the outcomes and the severity of the identified toxicities, the information obtained is of fundamental importance in structuring the care provided to the patients being treated.

Regarding the demographic, clinical and pharmacotherapeutic profile, it is worth noting that there is not much information available in the literature on how these variables can affect the treatment of women with ovarian cancer. The present study obtained results that may help in this discussion. In this context, one of the findings was that most of the women did not use QT concomitantly with any medication that interacted with the carbotaxol protocol.

Regarding the observed IM, it is important to note that AAS interacts moderately with dexamethasone, as shown in Frame 01. According to MICROMEDEX®, this interaction reduces serum concentrations of AAS, increasing the risk of thrombosis in patients. One of the patients exposed to IM had QT suspension and a protocol change due to grade 2 platelet disease. Although this was not related to the interaction between AAS and dexamethasone, the data found highlight the importance of performing studies that evaluate the presence of

drug interactions, once the patient is exposed to them, may negatively impact morbidity, mortality, hospitalization time, quality of life and health costs (Cardone *et al*., 2010; Marquito, Fernandes, Colugnati, 2014).

The data obtained on the main drugs that may interact with the studied protocol were important to contribute to the adoption of safety measures of the treatment of other patients with ovarian cancer using carbotaxol. In addition, patients mainly used drugs to control nausea and vomiting, for gastric protection and for pain control, showing that they were preventing or treating possible toxicities due to QT (Gockley, 2018; Rothman, Greenland 1998). The reason for this finding may be related to the post-QT protocol, which contains dexamethasone and ondansetron. In addition, it is common at the studied institution to prescribe medications to prevent gastrointestinal toxicities that are common in patients who undergo QT, as well as the prescription medications for pain, to prevent patients from being without medication if they have this symptom, which is common in cancer.

Although 93% and 90% of patients used dexamethasone and ondansetron, respectively, for nausea control, only 50% used metoclopramide, which is also present in the post-QT protocol. Among the results, nausea was the main toxicity recorded. This fact points to the lack of effectiveness of the therapeutic protocol used in the institution for the prevention of emesis. There is a need to intensify the correct use of the post-QT protocol, with more patients using metoclopramide or modification of the protocol so that the control of nausea and vomiting is effective, through the inclusion of more potent drugs, such as aprepitant (Yahata *et al*., 2016).

The study showed that more than half of the patients who were polymedicated presented grade $\geq$ 2 toxicity, which is considered a risk factor. In this way, professionals should adopt measures that promote the rational use of medicines, mainly evaluating the need for use. Cancer patients are complex and so polymedication is often inevitable (Balducci, Goetz-Parten, Steinman, 2013). In this context, it is important to follow patients throughout QT cycles in order to avoid them being exposed to the drug interactions and more severe toxicities (grade$\geq$ 2). The results of this study suggest that the polymerization may increase the risk for occurrence of grade $\geq$ 2 toxicities in these patients.

A review by Gockley *et al*. describes how the chemotherapeutic treatment of ovarian cancer can lead to various toxicities. According to these authors, more than 50% of patients are affected by peripheral neuropathy. Other reported toxicities include sexual dysfunction, gastrointestinal disorders (nausea, vomiting, constipation and diarrhea), cognitive dysfunction, mood alterations, fatigue and myelosuppression (Gockley, 2018). Although there

are data in the literature on the most frequent toxicities that can occur with the studied chemotherapeutic agents, there is not much information about the severity of these toxicities in patients. This fact shows the importance of the results obtained in the present study.

With regard to recorded toxicities, alopecia and asthenia were the most prevalent with grade $\geq$ 2, differing from the information available in the literature reporting peripheral neuropathy, ototoxicity and thrombocytopenia as more frequent and severe pharmacological toxicities related to carboplatin and paclitaxel (McEvoy, 2016; Pujade *et al*., 2010). In total, only 10% had peripheral neuropathy, 4% had thrombocytopenia, and no ototoxicity records were identified. This result may be related to underreporting of these toxicities by health professionals, as well as the difference between the demographic and clinical profiles of the patients between the present study and the others.

It should be noted that there is a range of information in the literature on the importance of the pharmaceutical in the follow-up of cancer patients, contributing both to the prevention and resolution of toxicities and other problems related to medication, as well as to the improvement of the quality of life of individuals undergoing treatment (Caracuel, Baños, Herrera, 2014; Edwards *et al*., 2013; Khalili, Farsaei, Rezaee, 2011). However, follow-up studies in women with gynecological tumors are scarce. As a way to avoid the toxicities shown in this study that negatively interfere in the treatment of women with ovarian cancer, it is suggested that hospitals should have trained and dedicated pharmacists to carry out a pharmacotherapeutic follow-up with the purpose of guaranteeing the effectiveness and the safety of these patients during QT.

This study did not identify the reasons for these outcomes in the patients. However, important information was obtained suggesting that grade $\geq$ 2 toxicity during QT may increase the risk of dose reduction, suspension or change of treatment. Among the 105 patients included in the study, more than half had one of the three studied outcomes; the majority had a toxicity record, and the frequency was higher among the patients presenting grade $\geq$ 2.

Although no statistical significance was observed in the association tests between the endpoints studied and the occurrence of grade $\geq$ 2 toxicity, the information obtained points to the need to adopt measures that may minimize the risks of the occurrence of the identified adverse reactions and the negative therapeutic results to improve the safety of patients with ovarian cancer who use the carbotaxol protocol; this is of considerable clinical relevance.

As a limitation of the study, it should be noted that retrospective data collection, through the analysis of medical records, may be subject to errors and under-reporting of

information. Lack of knowledge about drugs purchased by patients outside the institution studied is also a limitation, and the inclusion of this information could reveal other relevant issues. In addition, it was considered that all the drugs dispensed by the pharmacy were used by the patients, which is a bias of this work. However, this study fills an important scientific gap in describing the pharmacotherapeutic profile and the possible risk factors related to the occurrence of severe toxicities in Brazilian patients with ovarian cancer using the carbotaxol protocol, since studies with real-life data are scarce.

CONCLUSION

The study was able to identify the demographic, clinical, pharmacotherapeutic profile and the main toxicities that affect women with ovarian cancer treated with the carbotaxol protocol in a specialized oncology hospital in Brazil, highlighting the severity of the toxicities in these patients, as well as the main outcomes.

In addition, the present study has the potential to help health professionals to pay attention to the possible toxicities and outcomes that treatment with carbotaxol can cause in patients with ovarian cancer. It is essential that these women have follow-up before, during and after chemotherapy in order to avoid more severe toxicities and negative therapeutic outcomes.

It is also possible to improve the effectiveness of the treatment with carbotaxol and the safety of women with ovarian cancer who use this protocol through the identification of clinical, pharmacotherapeutic and toxicity profiles in patients.

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