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Systematic or Meta-analysis Studies

Taxanes during pregnancy in cervical cancer: A systematic review and pooled analysis

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A B S T R A C T

Background: Cervical cancer is one of the most common malignancies diagnosed during pregnancy. Taxanes administration has been established as theurapetic regimen in non pregrant women.
Objectives: This systemic review and meta-analysis aims to synthesize all available data from cervical cancer series in pregnant women and evaluate the efficacy and safety of taxanes during pregnancy.
Search strategy: Eligible articles were identified by a search of ClinicalTrial.gov and MEDLINE databases for the period 01/01/2000 up to 31/11/2017; The algorithm consisted of a predefined combination of the words "cervical", "cancer", "taxanes" and "pregnancy".
Selection criteria: PRISMA guidelines were applied in this study. The literature search and data extraction from all studies that examined the efficacy and safety of taxanes in pregnancy, were done by two independent investigators. Quantitative synthesis of the published articles was performed.
Data collection and analysis: Overall eight articles were retrieved. In all cases (14 pregnancies, 14 newborns) the use of taxanes in combination with platinum derivatives resulted in the birth of alive neonates, with not any miscarriage. The taxane derivative used in all cases was paclitaxel, combined with Cisplatin (13 pregnancies) and Carboplatin (one pregnancy).
Results: Complete and partial response was achieved in 7.2% and 92.9% of cervical cancer patients. In the majority of cases chemotherapy was well tolerated. The median progression-free survival was 48.5 months.
Conclusion: Taxanes administration during the 2nd and 3rd trimester of pregnancy is a safe choice.

Introduction

Cervical cancer is one of the most common malignancies diagnosed during pregnancy with an estimated incidence of 1:2000–10,000 pregnancies [11]. Discrepancies in inclusion criteria, such as live births, births beyond 20 weeks etc, may explain the variation of these results. Moreover an underestimation of the incidence of cervical cancer diagnosed during pregnancy may be due to lack of data of pregnancies that ended in a miscarriage or induced abortion. Management of cervical cancer during pregnancy represents a challenge for physicians due to its low incidence and to the lack of strong data. Multidisciplinary decision must be made taking into consideration the women's desire to retain gestation instead of terminating their pregnancy.

Several studies support the use of taxanes, especially paclitaxel, in combination with platinum derivatives as chemotherapy regimens [8]. Even though there are accumulating data in literature defending taxanes administration during the second and third trimester of pregnancy [13,15,21], their use remains controversial. Adding taxanes in Neoadjuvant Chemotherapy (NACT) schemes is a recent initiative; hence, there are still many questions regarding its safety for both women and neonates.

This is the first systematic review and meta-analysis incorporating all available data from literature and evaluating the effectiveness and safety of taxanes administration in cervical cancer during pregnancy.

Search strategy, data abstraction and statistics

This systematic review and meta-analysis was performed in accordance with the PRISMA guidelines [7]. The protocol of this systematic review has been submitted to the Institutional Review Board of Alexandra Hospital, Medical School of Athens, Greece and is available upon request. All eligible articles were identified by a search in

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ClinicalTrials gov and MEDLINE bibliographical database for the period 2000/01/01 – 2017/11/31. The search strategy consisted of the following keywords: ((cervical OR cervix) AND (neoplasms OR neoplasm OR cancer OR cancers OR carcinoma OR carcinomas)) AND (pregnancy OR pregnant OR gestation) AND (paclitaxel OR docetaxel OR taxane). Moreover, in order to further investigate potentially eligible papers, we meticulously examined all the references of correlated reviews and eligible articles that our research recruited. While working separately, two researchers (RZ and AMK) collected and analyzed data from each eligible study. All prospective and retrospective studies, as well as case reports, were considered eligible for this systematic review. Reviews of literature were ineligible whilst all cases where therapeutic abortion was preferred were excluded. Language restrictions were not applied.

All studies investigating the effectiveness and safety of taxanes (combined with platinum derivatives) when administered in cervical cancer during pregnancy, no matter of sample size, were eligible. From each one of those studies, the following data were extracted: first author, year of publication, chemotherapy regimen and agents administered during pregnancy, number of patients treated, patient age at diagnosis, FIGO stage at pregnancy, gestational age (GA) at diagnosis, pathological type (squamous, adenocarcinoma etc.), grade, GA at first cycle of chemotherapy administration, complete or partial response to chemotherapy, GA at delivery, way of delivery (cesarean section, etc.), pathological evaluation of the placenta, fetal outcome, weight at delivery, adverse effects of chemotherapy during pregnancy, treatment after pregnancy, overall survival (OS) in months, progression free survival (PFS) in months.

In case of overlapping publications emerging from the same study, the larger size study was evaluated, unless additional information was provided through multiple papers; in this case all articles were eligible and analyzed independently.

The quantitative synthesis and meta-analysis of the recruited articles was divided in two parts. First, the descriptive statistics regarding the age of cervical cancer patients, GA at delivery, GA at cervical cancer diagnosis, GA at chemotherapy administration and weight of neonates at delivery were calculated. Second, Kaplan-Meier survival curves were estimated for patients concerning: (i). OS and (ii). PFS. Statistical analysis was performed with STATA 11.1 statistical software (StataCorp, College Station, TX, USA).

Results

The previously mentioned search strategy recruited 23 articles. Out of these, 16 articles were considered to be irrelevant and seven articles were eligible [1–3,6,10,16,19]. Having investigated the references of the relevant reviews and eligible articles, one more article was added [4]. Overall, eight articles (14 pregnancies, 14 newborns) were entitled eligible for this systematic review and meta-analysis (Tables 1–3). The aforementioned stages are illustrated in Fig. 1.

The use of taxanes in combination with platinum derivatives resulted in the birth of alive neonates in all cases and there was not any miscarriage. Paclitaxel was administered in all identified pregnancies with the addition of cisplatin in 13 pregnancies (13 newborns) [1–4,6,10,16,19] and of carboplatin in only one retrieved case (1 newborn) [1]. The mean age of cervical cancer patients at diagnosis was 32.4 years (SD: 4.6; median: 32.4; range: 26–39). In 85.7% of cases (12/14) a diagnosis of squamous cell carcinoma was established [1–4,6,10,16,19]; whereas, in only one case (7.2% of cases) adenocarcinoma was diagnosed [4]; one more case was also present (7.2% of cases) of small cell neuroendocrine carcinoma [1]. The FIGO stage at diagnosis in pregnancy was early (FIGO stage I & II) in all cases except one with no available data [3]. The mean GA at cervical cancer diagnosis was 22.9 weeks of gestation (SD: 5.6; median: 25; range: 13–29.4), whereas the mean GA at chemotherapy administration was 26.4 weeks (SD: 3.9; median 26.7; range: 18–30.6). Data regarding EPO and/or G-CSF administration during the pregnancy were not provided.

Table 1
Summary of studies describing the administration of paclitaxel during pregnancy for cervical cancer.

Author	Treatment during pregnancy	G-CSF, EPO during pregnancy	FIGO stage at pregnancy	Pathological type, grade	Response	AE during pregnancy
Palaia et al. 2007	Cisplatin + Paclitaxel	N/A	IIB	Squamous cell carcinoma, grade 3	PR	Allergic reaction grade 3 (due to paclitaxel).
Chun et al, 2010	Paclitaxel + cisplatin	N/A	IB1	Small cell carcinoma	PR	None
Chun et al, 2010	Paclitaxel + carboplatin	N/A	IIA	Squamous cell carcinoma, grade 3	PR	None
Chun et al, 2010	Paclitaxel + cisplatin	N/A	IB2	Squamous cell carcinoma	PR	None
Li et al, 2011	Cisplatin + paclitaxel	N/A	IB2	Squamous cell carcinoma, grade 2	PR	Preterm contraction at 29^{+3} weeks
Li et al, 2011	Cisplatin + paclitaxel	N/A	IB2	Squamous cell carcinoma	CR	None
Fruscio et al, 2012	Cisplatin + paclitaxel	N/A	IB2	Squamous cell carcinoma, grade 3	PR	preterm contraction
Fruscio et al, 2012	Cisplatin + paclitaxel	N/A	IB2	Squamous cell carcinoma, grade 3	PR	Severe allergic reaction
Yousefi et al, 2012	Cisplatin + Paclitaxel	N/A	IB2	Squamous cell carcinoma	PR	Nausea, vomiting
Kong et al, 2014	Cisplatin + Paclitaxel	N/A	IB1	Mucinous Adenocarcinoma Grade 2	PR	None
Kong et al, 2014	Cisplatin + Paclitaxel	N/A	IB1	Squamous cell carcinoma	PR	None
Kong et al, 2014	Cisplatin + Paclitaxel	N/A	IB2	Squamous cell carcinoma, grade 3	PR	None
Geijteman et al, 2014	Cisplatin + Paclitaxel	N/A	IIB?	Squamous cell carcinoma, grade 2	PR	Neutropenia, Thrombopenia, decrease of creatinine clearance
Surbone et al, 2016	Cisplatin + Paclitaxel	N/A	IIB	Squamous cell carcinoma	PR	None

Table 2
Summary of studies describing fetal outcome after the administration of paclitaxel during pregnancy for cervical cancer.

Author	Age at pregnancy (y)	GA at diagnosis (w)	GA at chemo (w)	GA at delivery (w)	Pathological evaluation of placenta	Fetal outcome	Weight at delivery (g)	Way of delivery
Palaia et al, 2007	30	19?	N/A	35	N/A	Healthy at 10 months.	2400	CS
Chun et al, 2010	27	25 + 5	26 29 32	35 + 5	N/A	Healthy at 49 months	2570	CS
Chun et al, 2010	32	28 + 5	29 + 2	33 + 3	N/A	Healthy at 48 months	2,190	CS
Chun et al, 2010	27	28 + 4	30 + 4 33 + 4	36 + 5	N/A	Healthy at 60 months	2,600	CS
Li et al, 2011	36	27	27 + 2 29 + 2	33 + 3	N/A	Healthy at 21 months	2,200	CS
Li et al, 2011	39	29 + 3	29 + 4 31 + 4	33 + 6	N/A	Healthy at 13 months	2,200	CS
Fruscio et al, 2012	28	16	N/A	33	Normal	Respiratory disorder at birth, received mechanical ventilation. Healthy at 113 months	2030	CS
Fruscio et al, 2012	36	16	N/A	34	Normal	First degree intra-ventricular hemorrhage at birth. Healthy at 115 months	1900	CS
Yousefi et al, 2012	37	26	3rd trimester	33	N/A	Healthy at 6 months	2800	CS
Kong et al, 2014	31	19	22 25 28	33	N/A	Healthy at 8 years	N/A	CS
Kong et al, 2014	26	25	30	34 + 6	N/A	Healthy at 4 years	N/A	CS
Kong et al, 2014	38	13	18 21 24 27	35 + 2	N/A	Healthy at 3 years	N/A	CS
Geijteman et al, 2014	34	24	26	34	N/A	Severe bilateral perceptive hearing loss at 6 months	2085	CS
Surbone et al, 2016	33	22	28 31	34	Normal	Transient respiratory distress, hyperbilirubinaemia and hypoglycaemia at birth. Retroperitoneal embryonal rhabdomyosarcoma at 5 years	2040	CS

Table 3
Summary of studies describing the maternal outcome in patients with the administration of paclitaxel during pregnancy.

Author	Treatment after pregnancy (1st line)	OS mo	PFS mo
Palaia et al, 2007	Type III radical hysterectomy with systematic pelvic lymphadenectomy	> 13.75	> 13.75
Chun et al, 2010	Type III radical hysterectomy with pelvic and *para*-aortic lymph node dissection	51.5	48.5
Chun et al, 2010	Type III radical hysterectomy with pelvic and *para*-aortic lymph node dissection, refused adjuvant	> 33	33
Chun et al, 2010	Type III radical hysterectomy with pelvic and *para*-aortic lymph node dissection + Chemotherapy (Paclitaxel + cisplatin)	> 62.25	> 62.25
Li et al, 2011	Radical hysterectomy, bilateral pelvic lymphadenectomy + chemoradiation therapy (pelvic external radiation therapy with concomitant cisplatin chemotherapy)	> 22.5	> 22.5
Li et al, 2011	Radical hysterectomy, bilateral pelvic lymphadenectomy	> 14	> 14
Fruscio et al, 2012	Piver II radical hysterectomy with pelvic lymphadenectomy	> 113	11.25
Fruscio et al, 2012	Piver II radical hysterectomy with pelvic lymphadenectomy	> 115	21.5
Yousefi et al, 2012	Radical type III hysterectomy with pelvic and para-aortic lymphadenectomy and both ovarian transposition	> 73.5	> 73.5
Kong et al, 2014	type III radical hysterectomy with pelvic and para-aortic lymphadenectomy	> 107	> 107
Kong et al, 2014	Radical hysterectomy and 3 cycles post operative chemotherapy	> 52	> 52
Kong et al, 2014	Radical hysterectomy and 2 cycles post operative chemotherapy	> 53	> 53
Geijteman et al, 2014	Local radiation and hyperthermia	N/A	N/A
Surbone et al, 2016	Pelvic-aortic lyphadenectomy and radical hysterectomy after 6 months	> 73.5	> 73.5

Complete response (CR) to chemotherapy administered during pregnancy was achieved in only one case [6] (7.2% of cases) whilst partial response (PR) was achieved in 92.9% of cases (13/14) [1–4,6,10,16,19].

In most cases there were not any serious adverse events regarding taxanes administration during pregnancy. Of note, in two cases an allergic reaction emerged due to paclitaxel [2,10] and in another two cases preterm contraction was reported [2,6]. Nausea and vomiting was mentioned in only one case [19] and neutropenia, thrombopenia and decreased creatinine clearance in another one [3].

Cesarean section (SC) was performed in all cases [1–4,6,10,16], 19; the mean GA at delivery was 34.3 weeks (SD: 1.2; median: 34; range: 33–36.7). In none of the cases pathologic evaluation of the placenta was reported in the published articles. The mean weight of neonates at delivery was 2297.5 g (SD: 285.6; median 2200; range: 1.900–2.800). The majority of newborns were completely healthy at birth (11/14 – 78.5% of cases) with the exception of three cases [2,3,16]; in one case, a respiratory disorder that received mechanical ventilation was reported [2]. In another case, a first-degree intraventricular hemorrhage was mentioned [2] and last but not least, there was one case with transient respiratory distress, hyperbilirubinaemia and hypoglycemia [16]. Despite these complications regarding the fetal outcome, at the long-term analysis, all toddlers were healthy with a median follow up of 53 months. One case of retroperitoneal embryonal rhabdomyosarcoma 60 months post-delivery was reported probably due to paclitaxel, whereas severe bilateral perceptive hearing loss was mentioned 6 months post-delivery due to cisplatin administration in another case report [3].

Concerning progression free survival (PFS) for the patients, the Kaplan Meier curve is shown in Fig. 2; Overall survival (OS) as depicted in Fig. 3; was estimated using the Kaplan-Meier curve for the patients' population.

Further data extracted from all eligible studies regarding taxanes administration in combination with platinum derivatives in cervical cancer patients during pregnancy, are presented in Tables 1–3. The qualitative interpretation and the critically detailed evaluation of the individual eligible studies are provided, in the discussion section.

Discussion

This systematic review and meta-analysis, concludes that taxanes, when combined with platinum derivatives, may be safely administered in cervical cancer patients during the second and the third trimester of pregnancy, when necessary. In this pooled analysis there were 3 of 14 children with perinatal problems, and even though they all had recovered from them, it is a higher frequency than expected. Furthermore one of the babies developed an embryonal rhabdomyosarcoma (ERMS) at 5 years of age. Although ERMS is the most common type of soft tissue cancer in children, with an estimated incidence of 11 per Million [14], we cannot rule out that it was due to *in utero* exposure to chemotherapy. Earlier use of taxanes than this gestational stage remains doubtful as there is increased chance of abortion or congenital anomalies; of note, chemotherapy is contradicted in the first trimester of gestation, where organogenesis is taking place as there is a 10–20% risk of major malformation in this period [18]. Tumor response in pregnant women has been satisfactory with the combination of taxanes and platinum derivatives, as the endpoint of NACT is to obtain control of the neoplastic disease until fetal viability.

Nevertheless, definitive management guidelines for cervical cancer in pregnancy remain unclear; firstly, due to its low incidence and secondly, due to the possible adverse drug effects on the developing fetus and the long-term outcome in infants after *in utero* exposure. Taxanes belong to Category D according to the Food and Drug Administration (FDA), which means that it can be administered in pregnancy if necessary, and has more widely been used and studied in cases of breast and ovarian cancer. A gold rule between pregnant and non pregnant women diagnosed with cancer is not to be under of overtreated in some way. However surgery or radiotherapy in cervical cancer cannot be administered safely during pregnancy; consequently according to recommended guidelines patients diagnosed with cervical cancer during pregnancy should be treated in some way differently from non pregnant patients. Cervical cancer treatment in pregnancy remains a controversial issue for physicians as gestation involves a host of medical, ethical, religious and psychological decisions.

Optimal management of cervical cancer in pregnancy involves both mother and neonate protection from potentially harmful events of cancer treatment. According to this systematic review, taxanes combined with platinum derivatives may be safely administered. In all cases in which women desired not to terminate gestation, the neonate was born alive and in the majority of cases the newborn was completely healthy. In addition, there was normal fetal growth and neonate weight after delivery as well as acceptable Apgar score. It is important to mention that there is insufficient available literature regarding the long-term outcome in offspring as the median of follow-up is very short. Only one case of embryonal rhabdomyosarcoma at 5 years of age was reported possibly due to *in utero* exposure to chemotherapy [16]. Herein, it is important to comment on the unmet need of the creation of a database with long follow-up of these children.

Regarding administration of platinum derivatives per se in cervical cancer, accumulative data suggest that there is a higher risk of ototoxicity in children and adults, which is depending on the total dose received [12]. Of note, in a case reported by Geijteman et al. a 34 year old woman with cervical cancer received five weekly dosages of Cisplatin and Paclitaxel: in this case a neonate diagnosed with severe

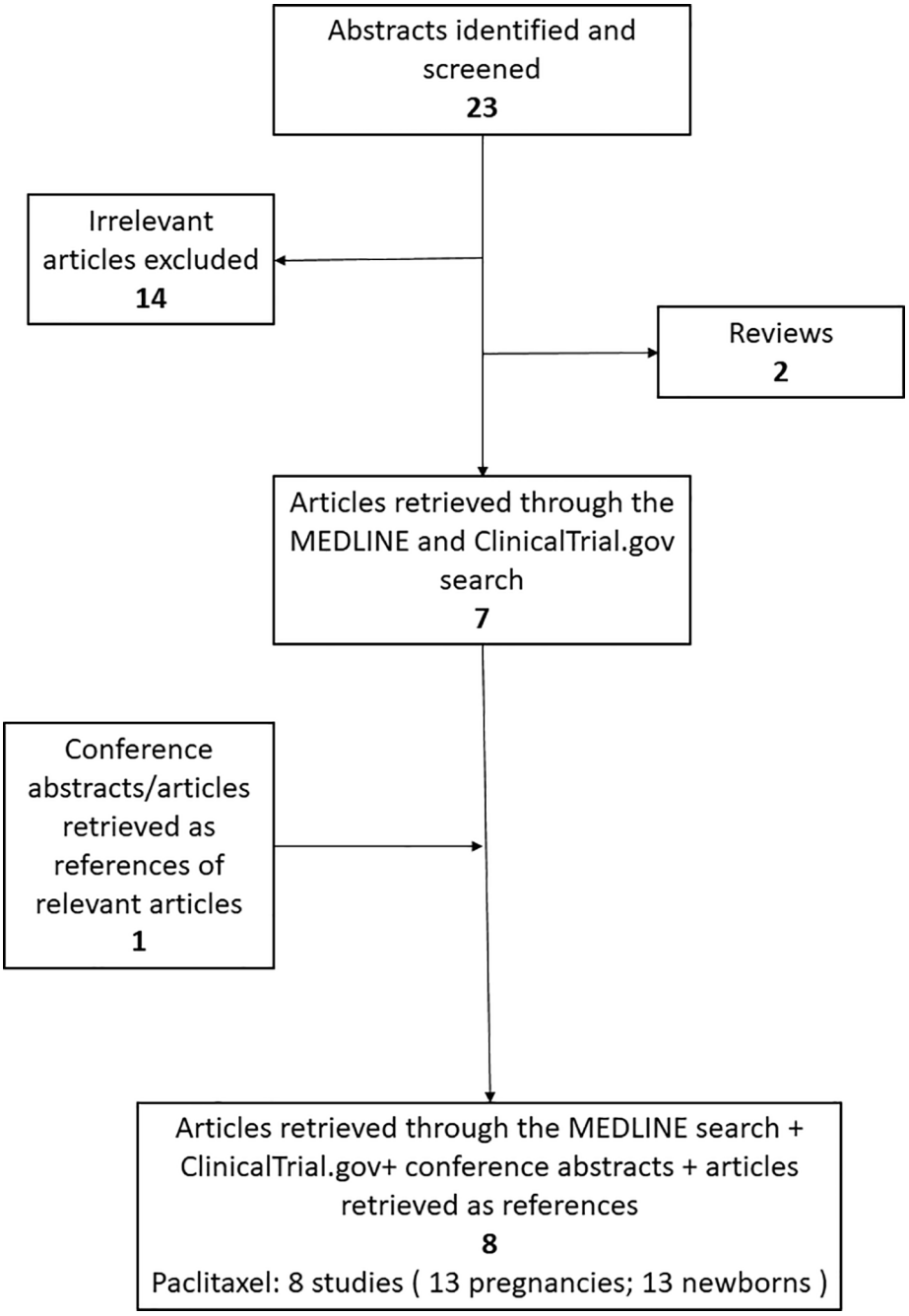

Fig. 1. Stages of the search strategy.

bilateral perceptive hearing loss was reported [3]. Consequently, *in utero* exposure of Cisplatin may be complicated with fetal ototoxicity.

In non-pregnant patients with cervical cancer bevacizumab administration seems to be the gold standard in stage IV cases, according to GOG-0240 clinical trial [17]. In pregnant cervical cancer patients, data are limited regarding bevacizumab administration. More specifically, inhibitor of angiogenesis; such as bevacizumab, have proven to be teratogenetic: in animal models they have shown to induce pregnancy loss and intrauterine growth restriction [5]. Of note, taking into consideration that angiogenesis is crucial for the development of the placenta and the fetus, it seems that angiogenetic agent are contradicted during pregnancy. However, accidental exposure to bevacizumab in the first trimester does not justify pregnancy termination.

Apart from cervical cancer, platinum derivatives have been administered during pregnancy in other malignancies such as non-small cell lung cancer, ovarian cancer, melanoma and neuroblastoma, without significant related fetal malformations [9]. Moreover, there are sufficient data on the safety of taxanes' administration during pregnancy in breast, ovarian, lung cancer [20].

As far as the limitations of this pooled analysis, it should be declared that the majority of individual studies did not provide the percentile of birth weight for each neonate (taking into account gestational age), as well as data regarding supportive care (such as use of EPO, G-CSG support, etc). Consequently, these data were not available in the systematic review.

An international registry of pregnant patients with cervical cancer is more than mandatory in order to improve diagnosis and treatment of these women. Such an effort has already been conducted in Europe with the creation of International Network on Cancer, Infertility and Pregnancy (INCIP), within the framework and support of ESGO

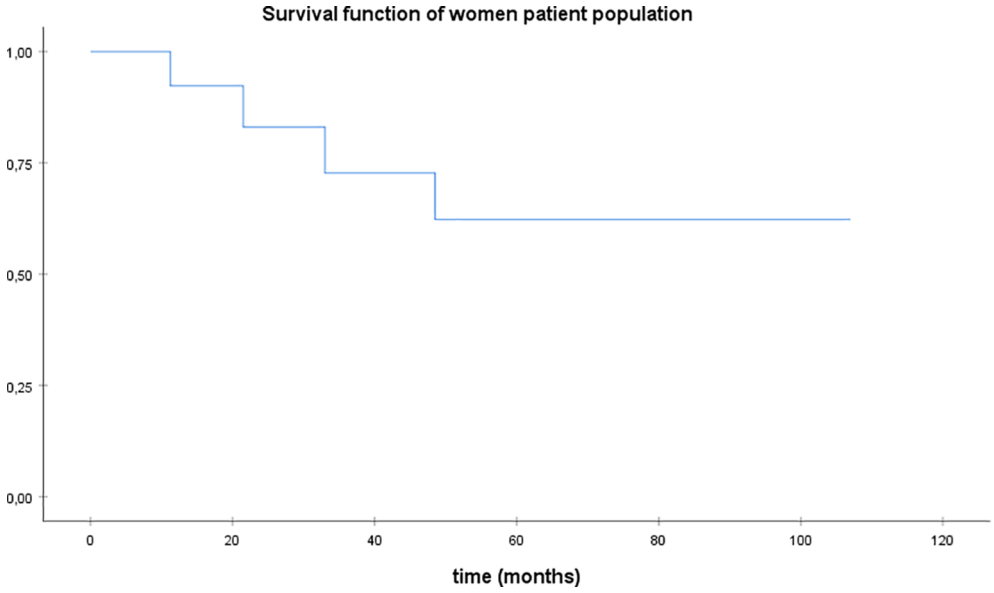

Fig. 2. Kaplan-Meier progression-free survival curves.

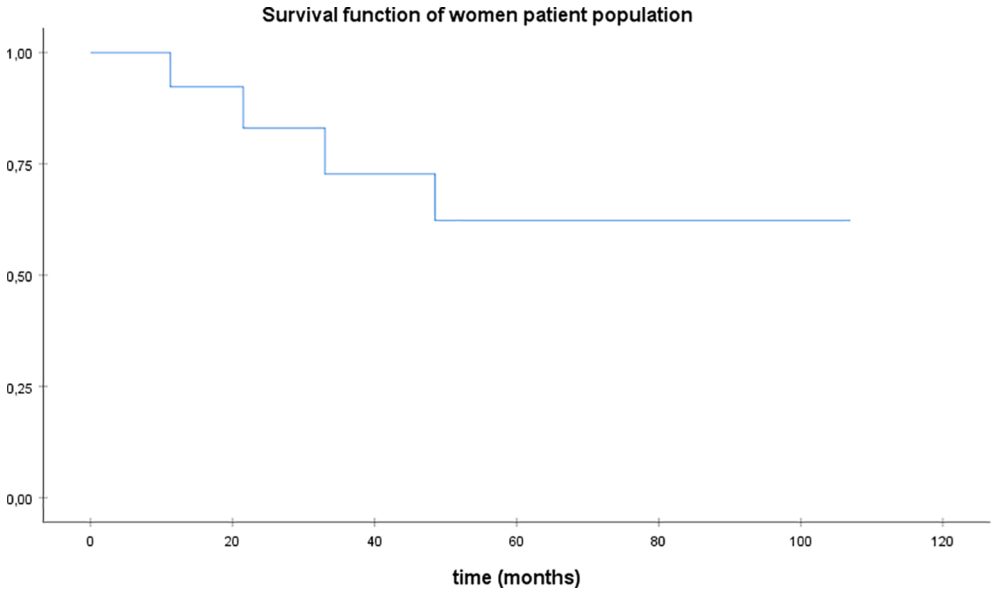

Fig. 3. Kaplan-Meier overall survival curves.

(European Society of Gynecological Oncology). Physicians from various centers of different European countries are more than encouraged to register their patients in these network, in order to extract more robust data in these uncommon neoplasms.

Authors' contributions

FZ, EZ and AMK were the writers of the article. RZ and AK were the two independent investigators, who performed the literature search and data extraction from all studies examined. The statistical analysis was performed by KA and PZ. MAD with FZ and DH contributed to conception and design of the study and to the revision of the manuscript. All authors have read and approved the final manuscript.

Declaration of Competing Interest

None of the authors have any competing interests.

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References

[1] Chun KC, Kim DY, Kim JH, Kim YM, Kim YT, Nam JH. Neoadjuvant chemotherapy with paclitaxel plus platinum followed by radical surgery in early cervical cancer during pregnancy: three case reports. Jpn J Clin Oncol 2010;40:694–8.
[2] Fruscio R, Villa A, Chiari S, Vergani P, Ceppi L, Dell'Orto F, et al. Delivery delay with neoadjuvant chemotherapy for cervical cancer patients during pregnancy: a series of nine cases and literature review. Gynecol Oncol 2012;126:192–7.
[3] Geijteman EC, Wensveen CW, Duvekot JJ, van Zuylen L. A child with severe hearing loss associated with maternal cisplatin treatment during pregnancy. Obstet Gynecol 2014;124:454–6.
[4] Kong TW, Lee EJ, Lee Y, Chang SJ, Son JH, Ryu HS. Neoadjuvant and postoperative chemotherapy with paclitaxel plus cisplatin for the treatment of Figo stage Ib

cervical cancer in pregnancy. Obstet Gynecol Sci 2014;57:539–43.
[5] Lambertini M, Peccatori FA, Azim Jr. HA. Targeted agents for cancer treatment during pregnancy. Cancer Treat Rev 2015;41:301–9.
[6] Li J, Wang LJ, Zhang BZ, Peng YP, Lin ZQ. Neoadjuvant chemotherapy with paclitaxel plus platinum for invasive cervical cancer in pregnancy: two case report and literature review. Arch Gynecol Obstet 2011;284:779–83.
[7] Liberati A, Altman DG, Tetzlaff J, Mulrow C, Gotzsche PC, Ioannidis JP, et al. The prisma statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration. BMJ 2009;339:b2700.
[8] Marth C, Landoni F, Mahner S, McCormack M, Gonzalez-Martin A, Colombo N. Cervical cancer: esmo clinical practice guidelines for diagnosis, treatment and follow-up. Ann Oncol 2018;29:iv262.
[9] Mir O, Berveiller P, Ropert S, Goffinet F, Goldwasser F. Use of platinum derivatives during pregnancy. Cancer 2008;113:3069–74.
[10] Palaia I, Pernice M, Graziano M, Bellati F, Panici PB. Neoadjuvant chemotherapy plus radical surgery in locally advanced cervical cancer during pregnancy: a case report. Am J Obstet Gynecol 2007;197:e5–6.
[11] Peccatori FA, Azim Jr. HA, Orecchia R, Hoekstra HJ, Pavlidis N, Kesic V, Pentheroudakis G. Cancer, pregnancy and fertility: esmo clinical practice guidelines for diagnosis, treatment and follow-up. Ann Oncol 2013;24(Suppl 6). vi160-70.
[12] Reichman O, Eldar-Geva T, Paltiel O. Pediatric outcome after maternal cancer diagnosed during pregnancy. N Engl J Med 2016;374:692–3.
[13] Ricci C, Scambia G, De Vincenzo R. Locally advanced cervical cancer in pregnancy: overcoming the challenge. A case series and review of the literature. Int J Gynecol Cancer 2016;26:1490–6.
[14] Harkins D Ries LAG, and et al Krapcho M, SEER Cancer Statistics Review, 1975-2003.
[15] Sood AK, Shahin MS, Sorosky JI. Paclitaxel and platinum chemotherapy for ovarian carcinoma during pregnancy. Gynecol Oncol 2001;83:599–600.
[16] Surbone A, Achtari C. Embryonal rhabdomyosarcoma in a child exposed to chemotherapy in utero: a mere coincidence? Eur J Obstet Gynecol Reprod Biol 2016;207:235.
[17] Tewari KS, Sill MW, Long 3rd HJ, Penson RT, Huang H, Ramondetta LM, et al. Improved survival with bevacizumab in advanced cervical cancer. N Engl J Med 2014;370:734–43.
[18] Weisz B, Meirow D, Schiff E, Lishner M. Impact and treatment of cancer during pregnancy. Expert Rev Anticancer Ther 2004;4:889–902.
[19] Yousefi Z, Hoshyar AH, Kadkhodayan S, Hasanzade M, Kalantari MR, Mottaghi M. Neoadjuvant chemotherapy and radical surgery in locally advanced cervical cancer during pregnancy: case report and review of literature. Oman Med J 2013;28:60–2.
[20] Zagouri F, Dimitrakakis C, Marinopoulos S, Tsigginou A, Dimopoulos MA. Cancer in pregnancy: disentangling treatment modalities. ESMO Open 2016;1:e000016.
[21] Zheng X, Zhu Y, Zhao Y, Feng S, Zheng C. Taxanes in combination with platinum derivatives for the treatment of ovarian cancer during pregnancy: a literature review. Int J Clin Pharmacol Ther 2017;55:753–60.