

# BC Cancer Protocol for Treatment of Platinum Resistant Epithelial Ovarian Cancer with Bevacizumab and Gemcitabine

**Protocol Code**

GOOVBEVG

**Tumour Group**

Gynecologic Oncology

**Contact Physician**

Dr. Jenny Ko

## ELIGIBILITY:

- Epithelial ovarian cancer, primary peritoneal, or fallopian tube carcinoma
- Platinum resistant disease (progression within six months of completing a platinum-containing protocol)
- Any number of prior lines of treatment

## EXCLUSIONS:

- Progressed while being treated on prior bevacizumab therapy
- neutrophils less than  $1 \times 10^9/L$
- performance status greater than ECOG 3
- major surgery within 4 weeks
- uncontrolled hypertension
- pregnancy or breastfeeding
- bleeding diathesis
- history of bowel obstruction or unresolved bowel obstruction (*see note in Precautions section, below*)

## RELATIVE CONTRAINDICATIONS:

- pre-existing motor or sensory neuropathy greater than grade 2
- uncontrolled arterial or venous thromboembolism
- MI or CVA within 4 months
- avoid NSAIDs and ASA if possible
- at risk of bowel obstruction (*see note in Precautions section, below*)

## TESTS:

- Baseline: CBC & diff, platelets, creatinine, [bilirubin](#), [ALT](#), [Alk Phos](#), sodium, potassium, dipstick or laboratory urinalysis for protein, blood pressure (BP) measurement, imaging as appropriate, tumor markers as appropriate
- Before each cycle, on Day 1: CBC & diff, dipstick or laboratory urinalysis for protein, blood pressure measurement, any initially elevated tumor marker,
- [If clinically indicated: creatinine, Alk Phos, ALT, bilirubin, LDH, protein level, albumin, GGT](#)
- In Cycle 1 and in any cycle in which a gemcitabine dose change has been made, before treatment on Days 8 and 15: CBC & diff, platelets
- In Cycle 2 and subsequent cycles when no gemcitabine dose change has been made, no lab work is required on Days 8 and 15
- 24 hour urine for protein if occurrence of proteinuria (dipstick urinalysis shows 2+ or 3+ or laboratory urinalysis for protein is greater than or equal to 1 g/L)
- Blood pressure measurement to be taken pre- and post-dose in first three cycles, and then pre-dose only subsequently
- For patients on warfarin, weekly INR until stable warfarin dose established, then INR at the beginning of each cycle
- Weight at baseline and every scheduled physician's visit
- If clinically indicated: CEA

**PREMEDICATIONS:**

- Antiemetic protocol for chemotherapy with low or low-moderate emetogenicity (see SCNAUSEA)

**TREATMENT:**

<b>DAY 1</b>		
<b>Drug</b>	<b>Starting Dose</b>	<b>BC Cancer Administration Guideline</b>
gemcitabine	800 mg/m <sup>2</sup>	IV in 250 mL NS over 30 minutes
bevacizumab	15 mg/kg*	IV in 100 to 250 mL NS over 30 to 60 minutes**

<b>DAY 8</b>		
<b>Drug</b>	<b>Starting Dose</b>	<b>BC Cancer Administration Guideline</b>
gemcitabine	800 mg/m <sup>2</sup>	IV in 250 mL NS over 30 minutes

<b>DAY 15</b>		
<b>Drug</b>	<b>Starting Dose</b>	<b>BC Cancer Administration Guideline</b>
gemcitabine	800 mg/m <sup>2</sup>	IV in 250 mL NS over 30 minutes

Repeat cycle every 28 days until disease progression (usual treatment 6 cycles); may continue bevacizumab alone if unacceptable toxicity to gemcitabine occurs.

\* bevacizumab dose does not need to be recalculated after Cycle 1 even if weight changes

\*\* first infusion over 60 minutes; subsequent infusions over 30 minutes. Observe for fever, chills, rash, pruritus, urticaria, or angioedema and stop infusion and contact the physician if any of these occur. Infusion reactions should be treated according to severity. If the bevacizumab infusion is restarted then it should be given at an initial rate to complete after 60 minutes or longer.

If acute hypertension (increase in BP measurement of greater than 20 mmHg diastolic or greater than 150/100 if previously within normal limits) occurs during bevacizumab infusion – stop treatment. Resume at half the original rate of infusion if blood pressure has returned to pretreatment range within one hour. If blood pressure does not return to pretreatment range within one hour – hold bevacizumab; subsequent infusions of bevacizumab should be given over 3 hours. Acute hypertension that is symptomatic (e.g., onset of headaches or change in level of consciousness) or BP measurement of greater than 180/110 that does not improve within one hour of stopping bevacizumab is an urgent situation that requires treatment.

Use only normal saline for line priming and flushing.

**DOSE MODIFICATIONS:**

1. **Hematology:** on day 1 in any cycle; and on day 1, 8 and 15 in cycle 1 and in all cycles in which a gemcitabine dose change has been made

ANC (x 10 <sup>9</sup> /L)		Platelets (x 10 <sup>9</sup> /L)	Dose
greater than or equal to 1.0	and	greater than or equal to 100	100%
less than 1.0	or	less than 100	<i>If day 1:</i> delay until recovery, then proceed at reduced gemcitabine dose of 700 mg/m <sup>2</sup> .
			<i>If day 8:</i> omit dose. If counts recover by day 15 proceed at reduced gemcitabine dose of 700 mg/m <sup>2</sup> .
			<i>If day 15:</i> omit dose. Proceed at reduced gemcitabine dose of 700 mg/m <sup>2</sup> with next cycle.

**Note:** If a recurrence of hematologic count problems occurs despite dose reduction to 700 mg/m<sup>2</sup>: either (i) discontinue gemcitabine if regimen had been day 1 and 8 only, or day 1 & 15 only; or, (ii) change to day 1 and 8 only, or day 1 and 15 only, if regimen had been day 1, 8 and 15.

2. **Febrile Neutropenia:** decrease subsequent gemcitabine doses to 700 mg/m<sup>2</sup>. If a recurrence of febrile neutropenia occurs despite dose reduction to 700 mg/m<sup>2</sup>: either (i) discontinue gemcitabine if regimen had been day 1 and 8 only, or day 1 & 15 only; or, (ii) change to day 1 and 8 only, or day 1 and 15 only, if regimen had been day 1, 8 and 15.
3. **Proteinuria:**

There are 3 different measures of proteinuria that may be used to assess the need for modification of bevacizumab therapy – urine dipstick analysis (measured in + values), laboratory urinalysis for protein (measured in g/L) and 24-hour urine collections for protein (measured in g/24 hours)

Urine dipstick analysis or laboratory urinalysis for protein should be performed at baseline and then prior to each cycle:

Degree of Proteinuria	
Neg or 1+ dipstick or less than 1 g/L laboratory urinalysis for protein	Administer Bevacizumab dose as scheduled
2+ or 3+ dipstick or greater than or equal to 1 g/L laboratory urinalysis for protein	Administer Bevacizumab dose as scheduled. Collect 24-hour urine for determination of total protein within 3 days before the next scheduled bevacizumab administration. <b>Adjust Bevacizumab treatment based on the table below.</b>
If urine dipstick shows 4+ at baseline or during treatment	Withhold Bevacizumab and proceed with 24 hour urine collection

24-Hour Urine Total Protein (g/24 hours)	Bevacizumab Dose
less than or equal to 2	100%
greater than 2 to 4	Hold dose and recheck 24-hour urine every 2 weeks. When less than or equal to 2 g/24 hour, resume therapy at 10 mg/kg
greater than 4	Withhold/Discontinue bevacizumab

4. **Hypertension:**

Blood Pressure (mmHg)	Bevacizumab Dose
less than or equal to 150/100	100%
greater than 150/100 asymptomatic	100% Notify physician and start or adjust antihypertensive therapy***
hypertensive crisis	discontinue therapy

- Antihypertensive therapy may include hydrochlorothiazide 12.5 to 25 mg PO once daily, ramipril (ALTACE®) 2.5 to 5 mg PO once daily, or amlodipine (NORVASC®) 5 to 10 mg PO once daily.

**\*\*\*Any patients presenting with chest pain, significant leg swelling, shortness of breath, new severe headaches or new neurologic symptoms, must be re-assessed by a physician before receiving further bevacizumab infusions.**

5. **Pneumonitis:** discontinue gemcitabine if pneumonitis occurs

6. **Other Non–Hematologic Gemcitabine Toxicities:** may include

- Mucositis
- Transient truncal rash
- Fatigue
- For Grade 3 toxicity, delay treatment until resolution of symptoms, then resume at 700 mg/m<sup>2</sup>. If dose already reduced, switch to day 1 and 8 only or day 1 and 15 only. If Grade 3 toxicity persists, discontinue gemcitabine.
- For Grade 4 toxicity, discontinue treatment.
- Doses reduced for toxicity should not be re-escalated.

**PRECAUTIONS:**

- Bowel-related Toxicities:** Use of bevacizumab carries a risk of bowel perforation and other serious bowel problems. In the AURELIA study, the bowel-related exclusion criteria were: history of bowel obstruction (including subocclusive disease) related to underlying disease, a history of abdominal fistula, GI perforation or intra-abdominal abscess, evidence of rectosigmoid involvement by pelvic examination, bowel involvement on CT imaging, or clinical symptoms of bowel obstruction.

2. **Neutropenia:** Fever or other evidence of infection must be assessed promptly and treated aggressively. Refer to BC Cancer Febrile Neutropenia Guidelines.
3. **Gastrointestinal perforations and wound dehiscence:** Can be fatal. Typical presentation is reported as abdominal pain. Bevacizumab should be discontinued in patients with gastrointestinal perforation or wound dehiscence.
4. **Hemorrhage:** Bevacizumab has been associated with hemorrhage. Cases of CNS hemorrhage, some with fatal outcome, have been observed. Patients should be monitored for signs and symptoms of CNS bleeding. If Grade 3/4 hemorrhage occurs, discontinue bevacizumab. Patients with significant bleeding diatheses should not receive bevacizumab. Platelet inhibitory medications such as NSAIDs (including ASA at doses greater than 325 mg/day) should be discontinued prior to institution of bevacizumab. COX-2 inhibitors are permissible.
5. **Thrombosis:** A history of arterial thromboembolic events or age greater than 65 years is associated with an increased risk of arterial thromboembolic events with bevacizumab. If Grade 3 thromboembolic event or incidentally discovered pulmonary embolus arises, hold bevacizumab for 2 weeks, then consider resumption of bevacizumab if risks of tumour-related hemorrhage are judged low AND the patient is on a stable dose of anticoagulant. If a second Grade 3 thrombosis occurs, or if a Grade 4 thrombosis occurs, discontinue bevacizumab. Patients on warfarin should have INR checked frequently, at least once every 2-3 weeks, while receiving bevacizumab.
6. **Proteinuria:** Has been seen in all clinical trials with bevacizumab to date and is likely dose-dependent. If proteinuria of greater than or equal to 2 g/24 h persists for more than 3 months, consider further investigations - possibly a renal biopsy.
7. **Hypertension:** Has been seen in all clinical trials with bevacizumab to date and is likely dose-dependent. The most commonly used therapies are calcium channel blockers, ACE inhibitors and diuretics. Blood pressure should be monitored through routine vital signs evaluations. If hypertension is poorly controlled with adequate medication, discontinue bevacizumab.
8. **Reversible Posterior Leukoencephalopathy Syndrome (RPLS):** Rarely, patients may develop seizures, headache, altered mental status, visual disturbances, with or without associated hypertension consistent with RPLS. May be reversible if recognized and treated promptly.
9. **Congestive Heart Failure:** Has been reported in up to 3.5% of patients treated with bevacizumab. Most patients showed improvement in symptoms and/or LVEF following appropriate medical therapy.
10. **Renal Dysfunction:** Irreversible renal failure associated with hemolytic uremic syndrome may occur (rare). Use caution with pre-existing renal dysfunction.
11. **Pulmonary Toxicity:** Acute shortness of breath may occur. Discontinue treatment if drug-induced pneumonitis is suspected.
12. **Fever and Flu-like Symptoms:** may commonly occur (fever 37%, flu-like symptoms 19%). Use acetaminophen as necessary for comfort.
13. **Drug Interaction – warfarin:** gemcitabine may cause increased anticoagulant effect of warfarin. Monitor INR carefully during and for 1 to 2 months after gemcitabine therapy; adjust warfarin dose as necessary.

**Call Dr. Jenny Ko or tumour group delegate at (604) 877-6000 or 1-800-663-3333 with any problems or questions regarding this treatment program.**

## References

1. Pujade-Lauraine E, et al. Bevacizumab combined with chemotherapy for platinum-resistant recurrent ovarian cancer: the AURELIA open-label randomized phase III trial. *J Clin Oncol* 2014; 32(13):1302-8.