



Prophylactic Antibiotic Dosing in Maternal Care: Implementation of a Weight-Based Gentamicin Nomogram for Labor and Delivery

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Introduction

- The American College of Obstetricians and Gynecologists (ACOG) recommends the inclusion of gentamicin in surgical prophylaxis regimens for patients undergoing obstetric procedures such as caesarean section.
- The ACOG gentamicin 5 mg per kg dose must be calculated based on a patient's actual body weight (ABW) unless the ABW is 20% greater than ideal body weight (IBW), in which case an adjusted BW is calculated for dosing. This process to calculate a dosing weight and subsequent gentamicin dose can lead to uncertainty, delays in drug delivery, and potential dosing errors.

Purpose

The objective of this project is to create an easy-to-use, calculation-free, visual dosing nomogram to verify the appropriate, prophylactic gentamicin dose in patients undergoing obstetric procedures.

Methods

- Clinical pharmacists reviewed the ACOG guidelines and created a plan to implement an easy-to-use visual nomogram for healthcare professionals to dose gentamicin 5 mg per kg, utilizing only the patient's ABW and IBW, without calculations.
- When a patient's ABW is more than 20% above IBW, ACOG recommends an adjusted body weight for gentamicin dosing, which is *the IBW plus 40% of the difference between ABW and IBW*.
- The visual nomogram will have IBW on the x-axis and ABW on the y-axis, each starting at 30 kg and increasing by 5 kg.
- With only the ABW and IBW, one can find the nomogram intersection that will yield the appropriate gentamicin dose for each patient.
- Calculating an adjusted body weight when utilizing this resource is unnecessary as it is incorporated into the nomogram.
- Institutional review board approval was obtained for this project.

Gentamicin Nomogram

↔ **Gentamicin dose at 5 mg per kg is based on the patient's ABW** ↔
If the patient's ABW >20% above IBW: Dosing Weight = IBW + 0.4 (ABW - IBW)

150	390	405	420	435	450	465	480	495	510	525	540	555
145	380	395	410	425	440	455	470	485	500	515	530	545
140	370	385	400	415	430	445	460	475	490	505	520	535
135	360	375	390	405	420	435	450	465	480	495	510	525
130	350	365	380	395	410	425	440	455	470	485	500	515
125	340	355	370	385	400	415	430	445	460	475	490	505
120	330	345	360	375	390	405	420	435	450	465	480	495
115	320	335	350	365	380	395	410	425	440	455	470	485
110	310	325	340	355	370	385	400	415	430	445	460	475
105	300	315	330	345	360	375	390	405	420	435	450	465
100	290	305	320	335	350	365	380	395	410	425	440	500
95	280	295	310	325	340	355	370	385	400	415	475	475
90	270	285	300	315	330	345	360	375	390	450	450	450
85	260	275	290	305	320	335	350	365	380	425	425	425
80	250	265	280	295	310	325	340	355	400	400	400	400
75	240	255	270	285	300	315	330	375	375	375	375	375
70	230	245	260	275	290	305	350	350	350	350	350	350
65	220	235	250	265	280	325	325	325	325	325	325	325
60	210	225	240	255	300	300	300	300	300	300	300	300
55	200	215	230	245	275	275	275	275	275	275	275	275
50	190	205	220	250	250	250	250	250	250	250	250	250
45	180	195	225	225	225	225	225	225	225	225	225	225
40	170	200	200	200	200	200	200	200	200	200	200	200
35	175	175	175	175	175	175	175	175	175	175	175	175
30	150	150	150	150	150	150	150	150	150	150	150	150
	30	35	40	45	50	55	60	65	70	75	80	85

Actual Body Weight (ABW)

Ideal Body Weight (IBW)

Color	Body Weight Dose
Orange	Adjusted
Purple*	Adjusted
Green	Actual

*Dose is less than a lower ABW gentamicin dose.

Discussion

- Utilizing gentamicin 5 mg per kg, this dosing nomogram eliminates the need for the completion of real-time calculations by the pharmacist which decreases the chance of a dosing error in a time-sensitive situation.
- The purple area in the nomogram represents an inherent flaw with the dosing formula. Certain weight scenarios would result in a heavier patient receiving a lower dose of gentamicin. For example, a patient with an IBW of 50 kg and an ABW of 60 kg would qualify for a 300 mg dose. If this patient had a higher ABW of 65 kg, the nomogram provides a lower 280 mg dose.
- The values in the nomogram, including this dosing anomaly, were validated in a gentamicin ordering tool calculator created by the Pharmacy Informatics Department.
- The dosing irregularities will be modified to avoid administering a lower gentamicin dose in heavier individuals – there will be no decrease in the gentamicin dose as ABW increases. .

Conclusion

By creating a straightforward method that utilizes ABW and IBW to determine the appropriate gentamicin dose in patients undergoing obstetric procedures, this nomogram can minimize dosing errors and ensure adherence to ACOG guidelines.

References

- Soper D, Chelmow D. Prevention of infection after gynecologic procedures. ACOG Practice Bulletin. 2018. June 6;131:e172-e189.
- Coleman J, Murtha A, Silverman N. Use of prophylactic antibiotics in labor and delivery. ACOG Practice Bulletin. 2018. September 3;132:e103-e119.