
PROGENY



Vol. XXII No.4

January 2007

Obesity and Pregnancy

Obesity has become an epidemic not only here in the United States but worldwide. The World Health Organization (WHO) has declared obesity “a major killer disease of the millennium on par with HIV and malnutrition.” 300 million adults worldwide are obese; more than 1 billion are overweight and another 115 million suffer health related problems ranging from premature death to reduced overall quality of life. In the US approximately 64.5% of the total population is classified as either overweight or obese with morbid obesity affecting more than 9 million adults. Pregnancy is high risk for obese women with maternal and fetal risks throughout the antepartum, intrapartum, and postpartum period; extending well beyond the birth of the baby. This issue of Progeny will review the current literature and clinical studies looking at obesity and pregnancy and the associated risks for the woman and infant.

Defining Obesity

One of the most common methods used to define obesity is the BMI or Body Mass Index. This is calculated by weight in kg divided by height in meters squared; $BMI = \text{kg}/\text{m}^2$. The WHO uses the following classifications:

- Normal weight BMI 18.5-24.9
- Overweight BMI 25-29.9
- Obese BMI ≥ 30

Obesity can then be broken down further by classes:

- Class I BMI 30-34.9
- Class II BMI 35.-39.9
- Class III BMI ≥ 40

Potential Complications of Obesity during Pregnancy

Antepartum:

- **Difficulty in Perinatal Ultrasound Diagnosis.** When the BMI is in the 90th percentile a significant reduction in the perinatal ultrasound diagnosis of fetal heart, spine, and abdominal wall abnormalities has been shown. Ultrasound visualization of fetal anatomy is more difficult in the woman carrying a

- predominance of centralized adipose tissue. This is of serious concern considering this group of women is at a higher risk of infant birth defects.
- ***Inaccuracies in Abdominal Evaluation.*** An obese abdomen makes palpation to assess for fetal growth, lie, and presentation very difficult.
 - ***Increased Risk of Miscarriage.*** Obesity has been associated with an increased risk of first trimester and recurrent miscarriages. Three cohort studies have stated that obesity is an independent risk factor for spontaneous miscarriage in women who undergo fertility treatments.
 - ***Increased Risk of Infant Birth Defects.*** Since 1994 a number of studies have established an association between maternal obesity and infant birth defects. Anomalies have included: neural tube defects such as anencephaly, anomalies of the heart and intestinal tract, omphaloceles, orofacial clefts, and multiple congenital anomalies of the central nervous system.
 - ***Increased Risk of Stillbirth.*** A three times increase in antepartum stillbirth was found in morbidly obese women compared with women of normal BMI.
 - ***Increased Risk of Gestational Diabetes and Type 2 Diabetes.*** GDM is glucose intolerance first recognized in pregnancy. GDM represents early signs of T2DM. Studies have shown that within 15 years of pregnancy complicated by GDM 30% of normal BMI women and 70% of obese women develop T2DM. Sixty percent of women have an unplanned pregnancy and many may have undiagnosed diabetes putting the pregnancy at an increased risk of fetal malformation and fetal macrosomia.
 - ***Increased Risk of Preeclampsia and Gestational Hypertension.*** The risk for preeclampsia was 13.5% in the obese group versus 3.9% in the non-obese group. The risk is almost 5 times greater in the morbidly obese group; typically a BMI > 35.1
 - ***Increased Risk of a Macrosomic Infant.*** Maternal obesity is associated with LGA infants. Obesity has an effect on fetal size independent of maternal diabetes, resulting in larger infants. One study reported LGA infants or infants who grew rapidly were nine times more likely than normal weight infants to grow into obese adults.

Intrapartum:

- ***Slow Labor Progression.*** Labor progression is significantly slower than that of non-obese women before 6cm of cervical dilation. With nearly one half of women of childbearing age either overweight or obese, it is imperative to consider differences in labor progression by maternal pre-pregnancy BMI before additional interventions are initiated or performed. The studies speculated that this is occurring due to the added soft tissue deposits in the pelvis, coupled with a larger fetus might require more time and stronger contractions to progress labor. Obese women are more likely to have an inadequate contraction pattern during the first stage of labor and receive oxytocin for induction or augmentation compared to non-obese women.
- ***Difficulty in Fetal Monitoring.*** Due to the depth of maternal adipose, fetal monitoring by intermittent or continuous EFM using external transducers may be

technically difficult. The use of fetal scalp electrodes and intrauterine pressure catheters to ensure an acceptable standard of fetal monitoring may be needed.

- ***Increased Risk of Operative Vaginal Delivery.*** The risk of instrumental delivery was increased 18% in women with a BMI between 35.1 and 40 and 34% increased with a BMI greater than 40. The studies also showed a higher incidence of failed instrumental delivery leading to Cesarean delivery.
- ***Increased Risk of Shoulder Dystocia.*** Shoulder dystocia in the studies occurred 3 times more in the morbidly obese women. Obesity plays a role in that it is difficult to assess the position and attitude of the vertex in addition to performing the maneuvers required to manage the shoulder dystocia. Birth weight increases with increasing BMI which leads to macrosomic infants and an increasing risk for shoulder dystocia.
- ***Increased Risk of Cesarean Delivery.*** Cesarean Delivery was almost 3 times higher for a morbidly obese woman than a woman of normal BMI in one study and another study showed operative delivery was 33.8% in the obese group and 47.4% in the morbidly obese group compared to 20.7% in the non-obese group.

Anesthesia and Surgery: Potential Complications & Recommendations

- ***Failure of epidural insertion or multiple attempts needed.*** Obesity increases the incidence of analgesic failure and the need for replacement epidurals. The Cesarean rate among epidural recipients increases dramatically as BMI rises.
- ***Increased risk of aspiration during anesthesia.***
- ***Difficult intubation.***
- ***Poor peripheral access.*** Arterial lines may be needed in some situations.
- ***Difficulty in monitoring maternal blood pressures.*** Large cuffs are required for blood pressure measurement, raising technical difficulties when the BMI is >40. One study stated that portable blood pressure monitoring devices should not be used with an upper arm circumference greater than 35cm. If having difficulty with a cuff fit, a lower arm pressure with an automatic device is acceptable according to a staff anesthesiologist at UIHC.
- ***Increased retention of lipid-soluble agents, increased drug distribution, and more rapid desaturations have also been reported.***
- ***Effective hemostasis is crucial as postoperatively these women are difficult to assess for intra-abdominal bleeding.***
- ***Standard surgical equipment may be insufficient to assess the pelvis during surgery.*** Longer and wider instruments may be needed and are available through surgical supply companies.
- ***Check the weight limit of your operating table, and have a back up plan if needed.***
- ***Provide an anesthesia consult.***

Postpartum:

- ***Increased Risk of Wound and Endometrial Infections.***

- **Increased Risk of Major Postpartum Hemorrhage.** The risk of PPH rises with increasing BMI and is about 30% more frequent for a moderately raised BMI and about 70% more frequent for a highly raised BMI compared with the normal BMI group.
- **Breastfeeding Difficulties.** Obesity is associated with a reduced prolactin response to suckling. Prolactin is the hormone released from the anterior pituitary that initiates milk production thus leading to a potentially inadequate milk supply in this patient population. The mechanical difficulties of latching and proper positioning also pose a problem in establishing successful breastfeeding.
- **Prolonged Hospital Stay.** Due to potential complications such as PPH and wound infections.
- **Increased Risk of Thromboembolism.** Initiate early ambulation, as early as 2 hours postoperative, with adequate pain control. Pneumatic compression stockings used intra and post operatively for DVT prevention.

Things to Remember:

- ❖ It is important to involve these women and their families in an open and realistic discussion about their care and the risks involved while maintaining respect and dignity.
- ❖ Have a multidisciplinary team approach involving: primary care providers, obstetric providers, anesthesia, nursing, wound care, dieticians, physical therapy, lactation etc.
- ❖ Plan ahead, and prepare for emergencies. Have extra staff available to assist with operative vaginal deliveries and emergency C/S. Anticipate and prepare for shoulder dystocia and PPH. Notify and have appropriate staff and equipment available; anesthesia, operating team, larger surgical instruments etc.
- ❖ Have a heightened awareness of the likelihood of failed induction of labor, slow progress, fetal distress, and the risk of failed instrumental delivery leading to emergent C/S.
- ❖ Consider developing a protocol or care plan to provide safe care for this patient population on your unit.

~Amy Sanborn, RNC, BSN

QUESTIONS OR COMMENTS: Contact Amy Sanborn, R.N.C. or Penny Smith, R.N.C; Statewide Perinatal Care Program, Department of Pediatrics, 200 Hawkins Drive, Iowa City, Iowa 52242-1083. Call (319) 356-2637 or FAX 319-353-8861

Body Mass Index Table

	Normal					Overweight					Obese					Extreme Obesity																				
BMI	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
Height (inches)	Body Weight (pounds)																																			
58	91	96	100	105	110	115	119	124	129	134	138	143	148	153	158	162	167	172	177	181	186	191	196	201	205	210	215	220	224	229	234	239	244	248	253	258
59	94	99	104	109	114	119	124	128	133	138	143	148	153	158	163	168	173	178	183	188	193	198	203	208	212	217	222	227	232	237	242	247	252	257	262	267
60	97	102	107	112	118	123	128	133	138	143	148	153	158	163	168	174	179	184	189	194	199	204	209	215	220	225	230	235	240	245	250	255	261	266	271	276
61	100	106	111	116	122	127	132	137	143	148	153	158	164	169	174	180	185	190	195	201	206	211	217	222	227	232	238	243	248	254	259	264	269	275	280	285
62	104	109	115	120	126	131	136	142	147	153	158	164	169	175	180	186	191	196	202	207	213	218	224	229	235	240	246	251	256	262	267	273	278	284	289	295
63	107	113	118	124	130	135	141	146	152	158	163	169	175	180	186	191	197	203	208	214	220	225	231	237	242	248	254	259	265	270	278	282	287	293	299	304
64	110	116	122	128	134	140	145	151	157	163	169	174	180	186	192	197	204	209	215	221	227	232	238	244	250	256	262	267	273	279	285	291	296	302	308	314
65	114	120	126	132	138	144	150	156	162	168	174	180	186	192	198	204	210	216	222	228	234	240	246	252	258	264	270	276	282	288	294	300	306	312	318	324
66	118	124	130	136	142	148	155	161	167	173	179	186	192	198	204	210	216	223	229	235	241	247	253	260	266	272	278	284	291	297	303	309	315	322	328	334
67	121	127	134	140	146	153	159	166	172	178	185	191	198	204	211	217	223	230	236	242	249	255	261	268	274	280	287	293	299	306	312	319	325	331	338	344
68	125	131	138	144	151	158	164	171	177	184	190	197	203	210	216	223	230	236	243	249	256	262	269	276	282	289	295	302	308	315	322	328	335	341	348	354
69	128	135	142	149	155	162	169	176	182	189	196	203	209	216	223	230	236	243	250	257	263	270	277	284	291	297	304	311	318	324	331	338	345	351	358	365
70	132	139	146	153	160	167	174	181	188	195	202	209	216	222	229	236	243	250	257	264	271	278	285	292	299	306	313	320	327	334	341	348	355	362	369	376
71	136	143	150	157	165	172	179	186	193	200	208	215	222	229	236	243	250	257	265	272	279	286	293	301	308	315	322	329	338	343	351	358	365	372	379	386
72	140	147	154	162	169	177	184	191	199	206	213	221	228	235	242	250	258	265	272	279	287	294	302	309	316	324	331	338	346	353	361	368	375	383	390	397
73	144	151	159	166	174	182	189	197	204	212	219	227	235	242	250	257	265	272	280	288	295	302	310	318	325	333	340	348	355	363	371	378	386	393	401	408
74	148	155	163	171	179	186	194	202	210	218	225	233	241	249	256	264	272	280	287	295	303	311	319	326	334	342	350	358	365	373	381	389	396	404	412	420
75	152	160	168	176	184	192	200	208	216	224	232	240	248	256	264	272	279	287	295	303	311	319	327	335	343	351	359	367	375	383	391	399	407	415	423	431
76	156	164	172	180	189	197	205	213	221	230	238	246	254	263	271	279	287	295	304	312	320	328	336	344	353	361	369	377	385	394	402	410	418	426	435	443

Source: Adapted from *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report*.