



HHS Public Access

Author manuscript

Obes Surg. Author manuscript; available in PMC 2016 May 24.

Published in final edited form as:

Obes Surg. 2015 January ; 25(1): 191–194. doi:10.1007/s11695-014-1478-5.

The Effect of Insurance Status on Pre- and Post-operative Bariatric Surgery Outcomes

Sharon Hayes,

Department of Psychology, Keiser University, 10330 South Federal Highway, Port Saint Lucie, FL 34952, USA

Melissa A. Napolitano,

Department of Prevention and Community Health and Exercise and Nutrition Sciences, Milken Institute School of Public Health, The George Washington University, 950 New Hampshire Ave., Third Fl, Washington, D.C. 20052, USA

Michelle R. Lent,

Center for Obesity Research and Education, Temple University, 3223 N. Broad Street, Suite 175, Philadelphia, PA 19140, USA

G. Craig Wood,

Geisinger Obesity Research Institute, Geisinger Medical Center, 100 North Academy Avenue, Danville, PA 17822, USA

Glenn S. Gerhard,

Penn State Hershey Institute for Personalized Medicine, 500 University Drive, Hershey, PA 17033, USA

Brian A. Irving,

Geisinger Obesity Research Institute, Geisinger Medical Center, 100 North Academy Avenue, Danville, PA 17822, USA

George Argyropoulos,

Geisinger Obesity Research Institute, Geisinger Medical Center, 100 North Academy Avenue, Danville, PA 17822, USA

Gary D. Foster, and

Correspondence to: Sharon Hayes, sharonmhayes@gmail.com.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Hel-sinki Declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study to participate in a larger, longitudinal study. The current analyses were approved by the Geisinger Medical Center Institutional Review Board.

Conflicts of Interest We report the following role of funding sources and conflicts of interest:

- Dr. Foster served as a consultant to ConAgra Foods and Tate & Lyle during the time of this study. Dr. Foster is currently a full-time employee of Weight Watchers International.
- Dr. Napolitano received funding from the Living Heart Foundation.
- All other authors report no conflict of interest or financial disclosures.

Center for Obesity Research and Education, Temple University, 3223 N. Broad Street, Suite 175, Philadelphia, PA 19140, USA

Christopher D. Still

Geisinger Obesity Research Institute, Geisinger Medical Center, 100 North Academy Avenue, Danville, PA 17822, USA

Sharon Hayes: sharonmhayes@gmail.com; Melissa A. Napolitano: mnapolitano@gwu.edu; Michelle R. Lent: michelle.lent@temple.edu; G. Craig Wood: cwood@geisinger.edu; Glenn S. Gerhard: Gsgerhard@geisinger.edu; Brian A. Irving: bairving@geisinger.edu; George Argyropoulos: gargyropoulos1@geisinger.edu; Gary D. Foster: gary.foster@weightwatchers.com; Christopher D. Still: cstill@geisinger.edu

Abstract

Background—This study compared pre- and post-surgical data and outcomes among gastric bypass patients based on the type of insurance (Medicaid, Medicare, or private).

Methods—Data were examined from 2553 consecutive RYGB patients at a rural ASMBS Center of Excellence.

Results—Participants were primarily female (80.5 %), Caucasian (97.1 %), and middle-aged (45.9 years). Medicaid patients' BMI at consultation was significantly higher than the other two groups ($p<0.001$). Time to surgery was significantly longer for Medicaid (13.2 %) and Medicare (7.1 %) patients compared with privately insured patients ($p<0.001$). Pre-surgical weight loss and post-surgical percent of excess weight loss nadir did not differ among the groups. Type 2 diabetes remission rates were comparable across insurance groups.

Conclusions—Medicaid patients, although demographically different from their privately insured and Medicare counterparts, will benefit from surgery with comparable weight loss results and overall diabetes remission rates.

Keywords

Insurance; Medicaid; Bariatric surgery; Weight loss surgery; Diabetes

Background

In the USA, the Patient Protection and Affordable Care Act (PPACA) highlighted obesity screening and counseling as one of 15 preventative services that should be covered fully by public and private insurers [1]. The PPACA also provided states the opportunity to expand Medicaid coverage beginning in 2014 to those earning up to 133% of the federal poverty level (i.e., an individual earning \$14,865 per year or a family of four earning \$30,656 per year) [2]. New regulations may open Medicaid enrollment to millions of low-income Americans not previously eligible [2]. Given that Medicaid patients have the highest rate of obesity [3] and related medical comorbidities [4], bariatric surgeons may observe an increased number of Medicaid covered bariatric referrals related to the PPACA. Medicaid coverage may serve as a barrier to certain procedures due to provider reluctance to accept it as a result of reported difficulty obtaining procedure approval [5].

Several studies have evaluated bariatric surgery outcomes based on insurer status [4, 6–8]. One study revealed that length of post-surgical hospital stay (used as a proxy for

complications) was longer among a large sample of Medicaid and Medicare patients [8]. Studies comparing post-surgical weight loss among insurer groups at 12 [4, 6] and 24 [7] months have found no difference. These studies were limited, however, by combining Medicaid and Medicare patients [9] or by relatively small samples ($n < 40$) of Medicaid patients [6, 7].

In light of the PPACA and anticipated Medicaid expansion in many states in 2014, the current study sought to extend the existing literature by examining how Medicaid patients undergoing Roux-en-Y gastric bypass (RYGB) surgery compared to Medicare and privately insured bariatric surgery patients on several outcomes measured during the pre-surgical and post-surgical periods. Based on previous literature, it was hypothesized that Medicaid patients would achieve weight losses pre- and post-surgically comparable to other insurer groups. Exploratory analyses also were conducted to examine potential differences between the insurer groups, as well as to examine diabetes remission.

Methods

Data were examined from 2553 consecutive RYGB patients at a rural ASMBS Center of Excellence. Participants consented to participate in a larger, longitudinal study focused on the collection of medical, genetic, and psychosocial data [10]. The current analyses were approved by the Geisinger Medical Center Institutional Review Board.

The majority of patients were privately insured (62.9 %), with public insurance comprising the rest (21.0 % Medicare, 16.1 % Medicaid). The following variables were assessed: (1) demographics (sex, race, age); (2) body mass index (BMI, kg/m^2) at initial bariatric consultation; (3) time in days from consultation to surgery, (4) pre-surgical weight loss in kilogram (initial visit weight – surgical weight), (5) length of post-surgical hospital stay in days; and (6) percent of excess weight loss at nadir, defined as the maximum weight loss achieved from at least three available measurements between 6 and 36 months after surgery. Patients whose most recent measurement in the 6- to 36-month period was the lowest were excluded from the analysis of weight nadir (a total of 25 %, most of which were <36 months post-RYGB and had not yet reached weight nadir) [11]. Insurance status was categorized as privately insured, Medicaid, or Medicare. Chi-square analysis examined the differences between insurance groups on categorical variables (sex and race). ANOVA and ANCOVA (controlling for age, sex, initial BMI, and race) confirmed that the pattern of results did not change for continuous variables. For the subset of 684 patients with type 2 diabetes with sufficient follow-up data, diabetes remission was defined as having $\text{HbA1c} < 6.5\%$, $\text{glucose} < 7 \text{ mmol/L}$, and no use of antidiabetic drugs within 1 year following surgery. Previous research has indicated that the use of pre-operative insulin medication is the strongest predictor of diabetes remission [12]. For these patients, diabetes remission was compared between insurance groups using chi-square analysis and logistic regression model (controlling for age, other diabetes medication use, and pre-operative HbA1c).

Results

Participants were primarily female (80.5 %), Caucasian (97.1 %), and middle-aged (mean \pm SD=45.9 \pm 11.2). Table 1 describes the study variables by insurance status. Fewer men and Caucasians were Medicaid insured compared with the other insurer groups ($p<0.05$). Medicaid and privately insured patients were significantly younger than Medicare patients ($p<0.001$). Medicaid patients also were significantly younger than privately insured patients ($p<0.001$). Medicaid patients' BMI at consultation was significantly higher than the other two groups ($p<0.001$).

Time to surgery was significantly longer for Medicaid (13.2 %) and Medicare (7.1 %) patients compared with privately insured patients ($p<0.001$). Only Medicare patients' length of post-surgical stay was significantly longer than privately insured patients ($p<0.001$). There were no between-group differences for pre-surgical weight loss and post-surgical percent of excess weight loss nadir. The pattern of results did not change after controlling for demographics (age, sex, and race) and BMI at the initial bariatric consultation.

Pre-operative type 2 diabetes was observed most frequently in the Medicare group; however, remission rates were comparable across insurance groups (see Table 2). Significantly lower remission was observed in the Medicare insured no-insulin group (see Table 3).

Conclusion

Given the impending changes associated with PPACA, the current study examined bariatric surgery-related outcomes among Medicaid patients and other insured groups. Consistent with hypothesized results based on previous studies [4, 6, 7], post-surgical percent of excess weight loss nadir was comparable among insurer groups. Our large sample size offers substantially a more statistical power to detect between-group differences than previous studies [6, 7] and provides additional confirmation that Medicaid patients can achieve similar weight losses compared with other groups. These data underscore the benefits of bariatric surgery for a population with the highest number of obesity-related medical comorbidities [4].

Medicaid and Medicare patients had a 1.5-month longer interval between consultation and surgery compared with private insurer status. It is not entirely clear which factors contributed to this difference, but it may be partially due to greater insurance-related requirements [4] or the need for increased patient education [13] among Medicaid and Medicare patients. Under the PPACA, improvements in medical reimbursement and approval processes for Medicaid and coverage of obesity counseling may help to reduce disparities among insurer groups in time to surgery.

There were no differences in the length of post-surgical hospital stay between Medicaid patients and the other groups. This is consistent with the study of Alexander and colleagues [4] but differs from a previous study using the National Hospital Discharge Survey from 2002–2004 [8] that found bariatric surgery patients with Medicaid patients to be 3.2 times more likely to have a prolonged length of stay compared to other groups. Large prospective

studies with more diverse patient populations may provide additional insight into the relationship between insurance status and length of post-surgical hospital stay.

Related to type 2 diabetes remission, exploratory analyses demonstrated that overall remission rates were comparable across the insurance groups; however, within the no-insulin group, lower remission was observed in the Medicare group. Although the reason for this finding is unknown and should be investigated further, it is possible that it reflects the severity of or time with diabetes in the Medicare group. Age and time with diabetes are highly correlated, but it is possible that time with diabetes is a stronger predictor of remission.

To our knowledge, this is the largest study to date comparing pre- and post-surgical weight losses among insurer groups (Medicaid, Medicare, and private groups). Our study is limited, however, by the retrospective design and predominantly Caucasian sample. Further, patients were from a center of excellence, so generalizability to other bariatric centers and populations is unknown.

Overall, results from the current study provide additional evidence that Medicaid patients, although demographically different from their privately insured and Medicare counterparts, will benefit from surgery with comparable weight loss results and overall diabetes remission rates. Although the effects of the PPACA and Medicaid expansion on bariatric surgery practices are not yet known, surgeons, physicians, and policy makers alike should consider the significant benefits of bariatric surgery for Medicaid patients when making policy decisions.

Acknowledgments

This research was supported by research funds from the Geisinger Health System and the National Institute of Health (NIH) grants DK072488 (GSG, CDS, GA), DK088231 (GSG), DK091601 (GSG), and P30DK072488 (BAI). The preparation of this manuscript was supported, in part, by NIH fellowship support from 1F32HD066939-01A (SH) and F32DK096756 (MRL).

References

1. U.S. Centers for Medicare & Medicaid Services [Internet]. Baltimore: CMS; [cited April 2, 2014]. Available from: www.healthcare.gov
2. U.S. Centers for Medicare & Medicaid Services [Internet]. Baltimore: CMS; [cited April 2, 2014]. Available from: www.medicaid.gov
3. Finkelstein EA, Fiebelkorn IC, Wang G. National medical spending attributable to overweight and obesity: how much, and who's paying? *Health Aff (Millwood)*. 2003;W3-219–226. Suppl Web Exclusives. [PubMed: 14527256]
4. Alexander JW, Goodman HR, Martin Hawver LR, et al. The impact of medicaid status on outcome after gastric bypass. *Obes Surg*. 2008; 18(10):1241–5. [PubMed: 18618206]
5. Decker SL. In 2011 nearly one-third of physicians said they would not accept new Medicaid patients, but rising fees may help. *Health Aff (Millwood)*. 2012; 31(8):1673–9. [PubMed: 22869644]
6. Akkary E, Nerlinger A, Yu S, et al. Socioeconomic predictors of weight loss after laparoscopic Roux-Y gastric bypass. *Surg Endosc Other Interv Tech*. 2009; 23(6):1246–51.
7. Durkin AJ, Bloomston M, Murr MM, et al. Financial status does not predict weight loss after bariatric surgery. *Obes Surg*. 1999; 9(6):524–6. [PubMed: 10638475]

8. Dallal RM, Datta T, Braitman LE. Medicare and Medicaid status predicts prolonged length of stay after bariatric surgery. *Surg Obes Relat Dis.* 2007; 3(6):592–6. [PubMed: 17936089]
9. Pickett-Blakely OE, Huizinga MM, Clark JM. Sociodemographic trends in bariatric surgery utilization in the USA. *Obes Surg.* 2012; 22(5):838–42. [PubMed: 22399326]
10. Wood GC, Chu X, Manney C, et al. An electronic health record-enabled obesity database. *BMC Med Inform Decis Mak.* 2012; 12(1):45. [PubMed: 22640398]
11. Still CD, Wood GC, Chu X, et al. Clinical factors associated with weight loss outcomes after Roux-en-Y gastric bypass surgery. *Obesity (Silver Spring).* 2014; 22(3):888–94. [PubMed: 23804287]
12. Still CD, Wood GC, Benotti P, et al. Argyropoulos. A probability score for preoperative prediction of type 2 diabetes remission following RYGB surgery. *Lancet Diabetes Endocrinol.* 2014; 2(1):38–45. [PubMed: 24579062]
13. Balduf LM, Kohn GP, Galanko JA, et al. The impact of socioeconomic factors on patient preparation for bariatric surgery. *Obes Surg.* 2009; 19(8):1089–95. [PubMed: 19517200]

Table 1

Demographic, pre-surgical, and post-surgical differences based on insurer type

	Medicaid (n=412) % or (M±SD)	Medicare (n=536) % or (M±SD)	Private insurance (n=1605) % or (M±SD)	Statistical test
Sex				
Female	87.7 %	76.7 %	80.4 %	$\chi^2(2)=12.0^*$
Male	14.3 %	23.3 %	19.6 %	
Race				
Caucasian	92.0 %	97.4 %	98.3 %	$\chi^2(10)=57.9^{**}$
African American	5.6 %	2.4 %	1.4 %	
Other races	2.4 %	0.2 %	0.3 %	
Age (years)	39.9±9.9	52.9±11.5	45.0±10.1	$R(2, 2552)=197.7^{**}$
BMI at consultation (kg/m ²)	52.1±10.4	49.9±9.4	48.9±8.1	$R(2, 2552)=22.2^{**}$
Time to surgery (days)	368.7±220.1	344.3±213.8	320.0±176.3	$R(2, 2552)=11.7^{**}$
Pre-surgical weight loss (lb)	15.0±18.5	15.2±18.6	14.7±17.5	$F(2, 2552)=63.8^a$
Length of post-surgical hospital stay	2.7±3.1	3.2±4.6	2.4±3.1 (n=1602)	$R(2, 2549)=10.2^{**}$
Percent of excess weight loss nadir	78.0±25.0 (n=185)	74.2±25.4 (n=278)	77.6±24.0 (n=901)	$R(2, 1363)=2.2^a$

* $P<0.05$

** $P<0.001$

^aNon-significant

Table 2

Diabetes status and availability of diabetes remission outcomes

	Medicaid (<i>n</i> =412)	Medicare (<i>n</i> =536)	Private insurance (<i>n</i> =1605)	<i>p</i> value
Diabetes	38.8 % (<i>n</i> =160)	52.8 % (<i>n</i> =283)	36.9 % (<i>n</i> =592)	$\chi^2(2)=42.81$ $p<0.0001$
Of those with diabetes, the # with diabetes remission status available ^a	62.5 % (100/160)	70.0 % (198/283)	65.2 % (386/592)	$\chi^2(2)=3.02$ $p=0.221$

^aThis requires a minimum of 1 year follow-up with medication status and presence of laboratory results (glucose or HbA1c)

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Table 3

Insulin use and diabetes remission outcomes

	Medicaid (<i>n</i> =100 total)	Medicare (<i>n</i> =198 total)	Private insurance (<i>n</i> =386 total)	<i>p</i> value
Insulin use	<i>n</i> =41	<i>n</i> =111	<i>n</i> =143	
Percent with diabetes remission	14.6 %	9.0 %	13.3 %	$\chi^2(2)=1.44, p=0.486$
No insulin use	<i>n</i> =59	<i>n</i> =87	<i>n</i> =243	
Percent with diabetes remission	69.5 %	50.6 %	72.8 %	$\chi^2(2)=14.59, p=0.0007$

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript