

Management of Plastic Surgery Complications at a Tertiary Medical Center after Aesthetic Procedures

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Background: The aesthetic plastic surgery industry has seen tremendous growth, with Americans spending an estimated 20 billion dollars on procedures in 2020. However, the effect of complications from these procedures on the healthcare system is poorly understood. This study aims to create awareness regarding aesthetic procedure complications through the scope of plastic surgeons at a tertiary medical facility.

Methods: A retrospective chart review was performed on patients who received care at a single academic tertiary referral center over 5 years for complications from a cash-paid aesthetic procedure at an outside facility. Physician and hospital billing data were analyzed for relevant encounters.

Results: Patients in this study (n = 40) presented to the emergency department most frequently with complications secondary to abdominoplasty (35%), breast augmentation (27.5%), and injectable fillers (17.5%). The most common complications were infection (32.5%) and wound dehiscence (22.5%). Of those evaluated, 50% required inpatient admission. Additionally, 42.5% required surgical intervention. The distribution of payors included Medicaid (55%), commercial insurance (30%), and Medicare (7.5%), and 7.5% were uninsured. For physician billing, the total gross collection ratio was 21.3%, whereas the hospital billing total gross collection ratio was 25.16%.

Conclusions: Larger referral hospitals are well-suited to support the aesthetic community with complication management; however, the care required to serve this population is resource-intensive. These data advocate for thorough closed-loop patient–surgeon communication regarding risk–benefit analysis and detailed courses of action should complications arise. Likewise, stronger communication between ambulatory surgical centers and tertiary referral centers may also help minimize complications and subsequent healthcare needs. (*Plast Reconstr Surg Glob Open* 2024; 12:e6250; doi: [10.1097/GOX.00000000000006250](https://doi.org/10.1097/GOX.00000000000006250); Published online 23 October 2024.)

INTRODUCTION

Global surgical practices are realizing a rapid increase in aesthetic surgery. As of 2020, 15.6 million cosmetic

and 6.8 million reconstructive procedures have been performed at the expense of \$16.7 billion in the United States.¹ When comparing trends since 2000, the year 2020 yielded upward trends in cosmetic surgery, including a 65% increase in mastopexies, 112% increase in buttock lifts, and 938% increase in malar augmentations.¹ According to the International Society of Aesthetic Plastic Surgery, the global number of reconstructive procedures increased by 3.4% in 2023. When comparing 2019 with 2023, the number of procedures increased as follows: liposuction by 31.3%, rhinoplasty by 39.7%, buttock augmentation by 60.9%, and buttock lifts by 100.7%.² Delivering patients' aesthetic goals is a rewarding act of service, but management extends further into postoperative care, especially in the setting of complications. The effect of complications from plastic surgery procedures on the healthcare system has not been extensively studied; the result of which could promote physician collaboration and standardized management protocols across international hospitals.

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Received for publication March 20, 2024; accepted August 27, 2024.

This abstract was presented at Plastic Surgery The Meeting 2022, Boston, Massachusetts.

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DOI: [10.1097/GOX.00000000000006250](https://doi.org/10.1097/GOX.00000000000006250)

Disclosure statements are at the end of this article, following the correspondence information.

Plastic and reconstructive surgeons profoundly influence the surgical community. A study highlighted an almost one-and-a-half-fold increase in reimbursement directly attributable to plastic and reconstructive services, which facilitate complex reconstructive cases beyond the capabilities of other specialties.³ Additionally, although the value per plastic surgeon listed as the primary surgical team ranks below certain other subspecialties, such as cardiothoracic or neurosurgery, plastic surgeons are found to play a crucial role in joint cases within these higher reimbursement areas.⁴ This emphasizes the multifaceted and unique impact of plastic and reconstructive surgery on various healthcare sectors. With yearly increases in reconstructive and cosmetic surgery and the shear impact of these procedures, it is essential to understand how medical facilities can effectively support their patients. Concentration on the intraoperative safety of the patient is significant; the aftercare safety of the patient deserves equal attention. Although the risk may be low, postoperative complications can result from any procedure. For example, some of the most dangerous complications within cosmetic and aesthetic surgery include wound dehiscence, venous thromboembolism, visceral perforation, and hemorrhage.⁵ Although some of these can be life-threatening and create a psychological burden for the patient, postoperative complications can also affect a patient financially. In 2021, the average cost of aesthetic procedure complications was approximately \$27,000 per patient.⁶ The range of the costs can be higher depending on the severity of the complications and the follow-up care required. It is crucial to draw light on these to better manage the medical facilities performing these procedures.

Postoperative complications also impact physicians and medical facilities, continuing to highlight the need for cost analysis. Reconstructive surgeons are common consultants in operative care, creating wide financial contribution margins for supplies but high overall revenue.⁷ Thorough understanding of these economic contributions can promote resource allocation to narrow this margin without sacrificing profits or interspecialty collaborations where aesthetic priority may be beneficial. Additionally, plastic surgery complications have consequences on the patient, physician, and care facility. Evaluation of the financial consequences related to these complications may reduce the strain on institutions that manage these conditions. This study aims to investigate the healthcare costs associated with managing aesthetic procedure complications while identifying opportunities to streamline processes and reduce financial expenditures without compromise to the quality of patient care.

METHODS AND MATERIALS

Methodology included retrospective review of patients who presented to the emergency department at a single tertiary care facility for a postoperative complication that occurred after an aesthetic procedure. Data were collected on patients who presented between the years 2018 and 2022. Patients were included if they received care at our institution for a complication that resulted from

Takeaways

Question: When patients present to a tertiary medical center for management of a complication resulting from an aesthetic procedure, who is charged for their care and how are the hospital and physicians reimbursed?

Findings: This retrospective review describes 40 patients who presented most commonly with infections or wound dehiscence after abdominoplasty or breast augmentation. Most charges and payments received were from commercial insurance, whereas the gross collection ratio was lowest for those uninsured or insured by Medicaid.

Meaning: Larger referral hospitals are well-suited to support the aesthetic community with complication management; however, the care required to serve this population is resource-intensive.

an elective plastic surgery procedure. One patient was excluded from the sample because their breast implant complication occurred outside the expected lifespan of the device. People who were less than 18 years old, pregnant women, and incarcerated individuals were excluded from the study. The electronic medical record was reviewed to collect data elements including patient demographics and Current Procedural Terminology codes associated with the encounter. Physician and hospital billing data were extrapolated from financial charges associated with the Current Procedural Terminology codes. Annual billing statistics were collected for the entirety from the division of plastic surgery at our institution to serve as a reference data point. This study was conducted after approval by the institutional review board.

RESULTS

Demographics

There were 40 patients included in this sample. Most patients were female (95%) with a mean age of 44.5 years (SD = 12.7 y). The majority of patients were relatively healthy at baseline; however, 7.5% had type 2 diabetes, 17.5% were obese with a body mass index greater than 30 kg/m², and 22.5% had an existing diagnosis of hypertension. Approximately 10% of the participants were active smokers at the time of presentation to the emergency department. The location of the index surgery varied across the sample, with 35% receiving care in the United States, 57.5% internationally, and 7.5% not documented (Table 1).

Tertiary Facility Data

The procedure that most commonly led to emergency presentation was abdominoplasty (35%), followed by breast augmentation (27.5%) and injectable fillers (17.5%). There were 6 patients who presented after other types of surgery including mastopexy and liposuction. Chart review yielded identification of only 35% of the physicians who performed the index procedure. Of those identified, 9 were board certified in plastic and reconstructive

Table 1. Demographic Data

Variable	Value (n = 40)
Sex	
Female	38 (95%)
Male	2 (5%)
Age, y	44.5 (SD = 12.7)
Comorbidities	
Hypertension	9 (22.5%)
Obesity (BMI > 30 kg/m ²)	7 (17.5%)
Diabetes	3 (7.5%)
Smoking status	
Never	28 (70%)
Former	7 (18%)
Current	4 (10%)
Unknown	1 (2.5%)
Location of index surgery	
International	23 (57.5%)
The United States	14 (35%)
Unknown	3 (7.5%)
Insurance coverage	
Commercial	12
Medicaid	22
Medicare	3
Uninsured	3

Continuous variables reported as mean (SD). Binary and categorical variables reported as frequency (proportion).

surgery, 2 were general surgeons, 1 was an anesthesiologist, and 1 was a dermatologist. The anesthesiologist and dermatologist both had patients who developed complications after injectable fillers at local MediSpas.

The most common complications that occurred were infection (32.5%) and wound dehiscence (22.5%). Patients also presented for inflammatory reactions (10%), seromas (7.5%), hematomas (5%), and pain control (7.5%). The remainder of patients presented for other complications including drain concerns (2.5%) and acute facial arterial insufficiency (5%). Serious complications occurred in 3 patients, including cardiogenic shock from a pharmaceutical conversion error during an abdominoplasty, myocardial infarction at the time of a blepharoplasty and brow lift, and one mortality secondary to a pulseless electrical activity arrest during a breast augmentation.

A member of the plastic surgery team was consulted to evaluate all study participants who presented to the emergency department and were subsequently discharged without requiring hospital admission (50%). Of these patients who were discharged home from the emergency department, 5 were seen for outpatient follow-up with a plastic surgeon from our institution. Within the whole study sample, 50% of patients were admitted to the hospital from the emergency department. Of the patients who were admitted, 75% were primarily managed by the plastic surgery team. The remaining 25% included the 3 patients with serious complications (cared for by cardiology, neurology, and critical care teams) and 2 patients who were admitted to hospital medicine. On average, patients were admitted for 9.1 days (SD = 8.5 d, range 2–35 d). Of the whole sample, 42.5% required surgical intervention by a plastic surgeon at our institution (Table 2).

Table 2. Index Surgery and Tertiary Hospital Data

Variable	Value
Index procedure	
Abdominoplasty	14 (35%)
Breast augmentation	11 (27.5%)
Injectable fillers	7 (17.5%)
Other*	6 (15%)
Index surgeon	
Identified	14
Unknown	26
Identified surgeon's board certification	
Plastic and reconstructive surgery	9 (64%)
General surgery	2 (14%)
Anesthesiology	1 (7%)
Dermatology	1 (7%)
Complications	
Infection	13 (32.5%)
Wound dehiscence	9 (22.5%)
Inflammatory reaction	4 (10%)
Seroma	3 (7.5%)
Hematoma	2 (5%)
Pain control	3 (7.5%)
Acute facial arterial insufficiency	2 (5%)
Drain concerns	1 (2.5%)
Cardiogenic shock	1 (2.5%)
STEMI	1 (2.5%)
PEA arrest	1 (2.5%)
Hospital course following ED	
Hospital admission required	20 (50%)
Average length of stay	9.1 days (SD = 8.5, range 2–35)
Required surgical intervention	17 (42.5%)

*Continuous variables reported as mean (SD). Binary and categorical variables reported as frequency (proportion).

ED, emergency department; PEA, pulseless electrical activity; STEMI, ST-elevation myocardial infarction.

Payor Data

At the time of presentation to our emergency department for treatment of a complication, most patients were covered by Medicaid insurance (55%). Medicaid is a combined federal and state health insurance that supports individuals with limited income and resources. Fewer participants had commercial insurance (30%) or were uninsured (7.5%), and the remaining patients were covered by Medicare (7.5%), a federal insurance program for people who are 65 years of age or older or people with specific disabilities. The distribution of insurance coverage was stratified by the index surgery location. Within this sample, the majority of patients who had postoperative complications from international procedures were covered by Medicaid insurance (47.5%) (Fig. 1).

Physician and Hospital Billing Data

When analyzing the physician billing data, we stratified the information by payor to help interpret the variability of key performance indicators across insurance companies. Although commercial insurance and Medicaid comprised the majority of the total charges and payments received, they also represented the majority of the total adjustments. Next, we assessed the gross collection ratio

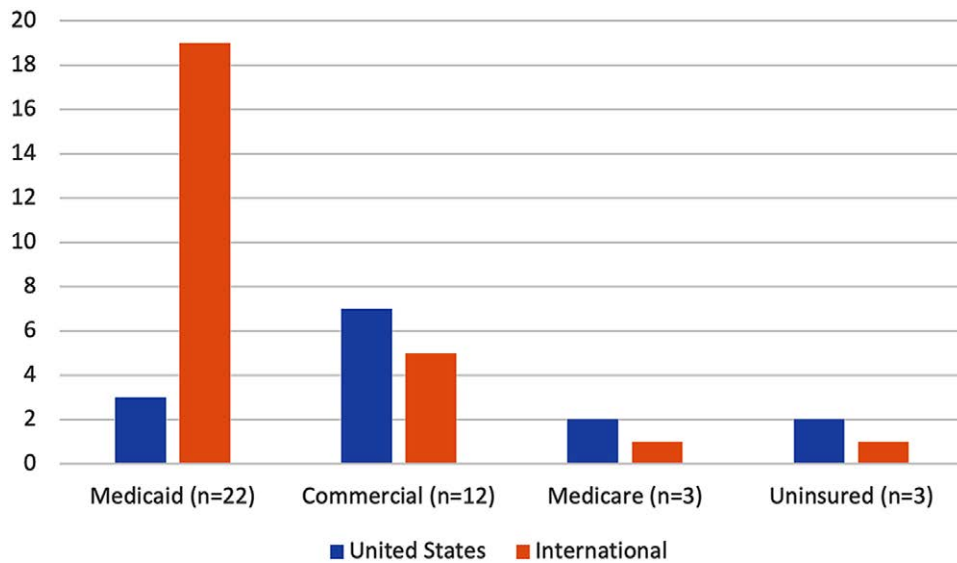


Fig. 1. Patients' insurance coverage at the time of complication stratified by the location of their index surgery.

Table 3. Physician Billing Data

Payor	Charges	Payment Received	Adjustments	GCR, %
Commercial	\$148,505.04	\$46,123.78	\$102,447.20	29.97
Medicaid	\$143,454.07	\$16,174.00	\$124,904.86	11.76
Medicare	\$53,062.00	\$11,966.84	\$40,633.84	23.34
Uninsured	\$18,076.01	\$3,015.40	\$15,578.82	22.41
Total	\$363,097.12	\$77,280.02	\$283,564.72	21.3

Table 4. Hospital Billing Data

Payor	Charges	Payment Received	Adjustments	GCR, %
Commercial	\$1,289,558.77	\$550,660.79	\$664,099.17	42.67
Medicaid	\$1,642,054.87	\$222,519.72	\$1,419,535.15	13.55
Medicare	\$715,964.01	\$158,130.25	\$557,833.76	22.09
Uninsured	\$61,556.09	\$1,800.00	\$59,756.09	2.92
Total	\$3,709,133.74	\$933,110.76	\$2,701,224.17	25.16

(GCR), which is defined as the total payments divided by the charges, times 100. This metric is a key performance indicator used by hospitals to monitor revenue cycles. We found that the total GCR of 21.3% was close to our reference point of 22.96% (the plastic and reconstructive surgery average GCR over a 1-year duration at our institution). However, keeping in mind that 55% of our population was covered by Medicaid, we were interested to find that the Medicaid GCR (11.76%) was much lower than the GCR of the other payors (Table 3).

When the hospital billing data were assessed, we found similar trends, with Medicaid and commercial insurance comprising the majority of the total charges and payments received. Over half of the total adjustments were for Medicaid. A reference hospital billing GCR collected over a 1-year time period was 29.1%. The hospital billing data for this sample of patients with elective plastic surgery complications suggest that the total GCR for this patient sample (25.16%) was similar to the reference

hospital billing GCR of 29.1% during a 1-year time period. Of note, Medicaid had the second lowest GCR (13.55%), only greater than the GCR of those who were uninsured (2.92%) (Table 4).

DISCUSSION

This study sought to raise awareness of aesthetic procedure complications which required subsequent care at a leading tertiary medical facility. Nearly half of the patients in this study required admission to the hospital, and the majority were covered by Medicaid. However, despite providing expansive coverage, Medicaid had the highest number of adjustments, which yielded the lowest GCR when compared with the other insurance providers. Although it is evident that larger referral hospitals are well-equipped to manage aesthetic procedure complications, these results provoke inquiry regarding who this responsibility falls on and how resource utilization can be best optimized. These insights shed light on the broader impact of complications

beyond the confines of the index facility, emphasizing the importance of understanding and addressing these challenges within the aesthetic community.

In addition, this study revealed cases requiring postprocedural emergent medical attention, most frequently after abdominoplasty, breast augmentation, or injectable fillers. These complications align with existing literature and systematic reviews that have highlighted elevated infection rates and wound dehiscence after procedures requiring postoperative travel.^{8,9} The American Society of Plastic Surgeons (ASPS) and the Centers for Disease Control and Prevention organizations recommend allowing a minimum of 1 week after surgery, with subsequent research extending up to 16 days, before traveling, to avoid potential complications arising from changes in atmospheric pressure within an aircraft.^{10,11} Existing literature has also highlighted an elevated risk of venous thromboembolism events after car rides lasting over 4 hours.¹² Moreover, adherence to enhanced recovery after surgery protocols emphasizes postoperative mobilization to enhance pain management and mitigate the potential for strength and muscle loss due to postoperative stress.¹³

The high rates of patients with Medicaid insurance seeking international surgery are possibly a result of the escalating cost of operations domestically. A study examining publicly reported prices found that the cost of breast augmentation rose by 30% and abdominoplasty by 51% in the United States from 2020 to 2021.¹⁴ Medicaid's strict criteria for cosmetic procedure coverage leave most procedures uncovered, leading many to seek affordable treatments abroad, often outside the standard of care. It has been demonstrated that lower-income and less-educated patients are more likely to assume physicians are properly certified by the board of plastic surgery, which is not always true.¹⁵ Our study reflects these findings, as a significant proportion of our patient population are Medicaid beneficiaries. Simultaneously, there has been a decline in reimbursement rates for reconstructive procedures covered by insurance companies. From 2010 to 2020, despite the US Medicare reimbursement, rates only rose by a marginal 2%.¹⁶ This disparity suggests that the escalating cost of care may be attributed, in part, to a reduced insurance reimbursement to plastic and reconstructive surgeons, potentially leading to higher prices for aesthetic procedures performed.

This study revealed that Medicaid had the second lowest GCR, with only the GCR of those who were uninsured being lower. This difference in GCR has implications for the standard of care and access to treatment for patients experiencing complications. Our results suggest a notable disparity between Medicare and Medicaid reimbursement rates for cosmetic procedure complications. Moreover, there is considerable state-by-state variation in reimbursement rates for common plastic surgery procedures, and the potential for complications varies greatly as well.¹⁷ Understanding these economic factors is crucial in promoting efficient resource allocation to narrow this margin without compromising profits or hindering interspecialty collaborations where aesthetic priorities may be beneficial.

Our tertiary medical facility and the providers who care for patients with complications are both impacted by relatively low reimbursement across the prevailing

government sponsored insurers. Studies have demonstrated that interprofessional networks of care team providers and discharge planning lead to decreased readmission rates.⁸ Continuous care from the same provider may also minimize resource utilization at larger tertiary centers, ensuring appropriate care and access to follow-up. Additionally, thorough closed-loop patient–surgeon communication can provide detailed courses of action in the event of any complication, ensuring better patient outcomes and a decreased burden on plastic surgeons at tertiary medical centers. However, patient–surgeon communication cannot be perceived as a solution to complications that require higher levels of care and in cases when patients are at remote distant location from their index surgeon (ie, international procedures). This, however, only addresses minor postoperative issues, such as drain-related occurrences or pain control, that can be managed via phone or an outpatient visit. Patient–surgeon communication cannot be perceived as a solution to complications that require higher levels of care and in cases when patients are at remote distant location from their index surgeon or in which the individual lacks the proper training and qualifications to care for their operative complications.

At the systemic and institutional level, legally requiring surgeons to maintain credentials at a major city hospital where they practice, along with protocols for transferring patients to their primary surgeon's hospital in cases of postoperative complications, could improve patient care standards. Concerns also arise from non-plastic surgery trained providers, as seen in this study, performing aesthetic procedures which are further being driven by financial incentives.^{18–20} Education by all-board certified plastic surgeons in the United States, in conjunction with the efforts of the ASPS, as seen in the “Do Your Homework” campaign in 2015, is crucial for allowing patients to understand the risks of seeking care from inadequately qualified providers. Additionally, it may be beneficial to legally require surgeons to maintain credentials at a major hospital in the city where they practice to better provide care for postoperative complications. Systemic processes could be adjusted to reflect a protocol for transferring patients to the hospital in which their primary surgeon has privileges so that the surgeon can provide direct care. One challenge for patients lies in discerning which practitioners possess the skillset for specific procedures. We propose improved patient education of the ASPS directory of accredited plastic and reconstructive surgery providers, which could simplify the process of selecting a surgeon that aligns with the patient's goals. Gaining such insights holds substantial value in the optimization of patient care and efficient utilization of resources within the realm of aesthetic surgery.

Limitations

Although the results of this study are notable, it is also worth considering the estimated occurrence of complications after cosmetic surgery. This study identified a sample of 40 patients who presented over a 5-year duration. The Aesthetic Society reported that an average plastic surgeon performed a mean of 270 cosmetic procedures per year

in 2020 and 2021.²¹ It could be extrapolated that 1 plastic surgeon performs more than 1000 aesthetic cases over 5 years. There are approximately 100 plastic surgeons referenced on the ASPS website near our city.²² Therefore, our study represents a relatively small number of complications that resulted after an estimated 100,000 procedures performed in our community during the duration of our data collection. In summary, the scale of this problem and the impact of these costs on our healthcare system as a whole are difficult to define solely by the key financial indicators assessed in this study. Considering this study only examines the experience of one institution, it is likely we did not capture all complications that occurred during this time period given patients may have sought care in the private sector or at other tertiary centers in the region.

This study is limited by the retrospective nature of the data collection. It is also worth noting that these data were partially collected during the COVID-19 pandemic, which may have implications on the reported results. Additionally, the results capture the experience of a single institution which is located in close proximity to an international border, which may limit generalizability of the findings. Future iterations of this study would benefit from a more robust sample size capturing a broader geographic distribution, with varying degrees of proximity to larger referral institutions. Additionally, it would be beneficial for such studies to consider the varying levels of accessibility to the site of index procedure.

CONCLUSIONS

These findings suggest that larger referral hospitals are well-suited to support the aesthetic community with complication management; however, the care required to serve this population is resource-intensive. The results of this study provide insight into the financial impact of complications outside the index facility. Our findings support the need for systemic and institutional changes in addition to thorough and longitudinal communication between surgeons and patients to help minimize complications and healthcare needs. Additionally, the data advocate for thorough closed-loop patient–surgeon communication regarding risk–benefit analysis and detailed courses of action should any complication arise.

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DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

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