

Outpatient Dismissal With a Responsible Adult Compared With Structured Solo Dismissal: A Retrospective Case-Control Comparison of Safety Outcomes

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Abstract

Objective: To test the hypothesis that patients dismissed alone in a sedation dismissal process (SDP) have no greater risk of adverse outcome compared with those who were dismissed with a responsible adult.

Patients and Methods: We compared 2441 SDP patients undergoing 2703 procedures with 4923 unique control patients who underwent 5133 procedures between June 1, 2012, and March 31, 2017.

Results: The rate of unplanned readmission related to the procedure was 0.11% (n=9), and there was no difference between SDP (0.07%) and controls (0.14%). Similarly, there was no difference in complication rates between SDP patients and controls when restricting to “all causes” unplanned readmissions within 24 hours and unplanned readmissions related to procedure.

Conclusion: With proper preparation, short-acting anesthetic/sedation medications, and sound clinical judgment, the presence of a responsible adult escort is not associated with reduced risk following discharge after ambulatory anesthesia. This practice may lessen the hardships reported by patients in needing to obtain an escort and the inconveniences and delays experienced by ambulatory procedural facilities when patients arrive without a designated escort.

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The past 2 decades have seen a shift from inpatient care to outpatient care, resulting in an increasing number of procedures requiring anesthesia services occurring in both ambulatory and office-based settings.^{1,2} This change in procedural demographic characteristics stems in part from advances in shorter-acting anesthetic agents (eg, propofol) that help limit cognitive impairment and thereby enable patients to return to their normal daily activities more readily.² Although many studies have pointed to limited long-term cognitive and functional impact from undergoing these shorter procedures under anesthesia, professional society guidelines vary as to requirements for patients leaving with an escort.^{3,4} Furthermore, there remains no clear and consistent definition as

to who this escort should be and how long a responsible person should remain with the patient after their procedure.⁴

Requiring escorts and other responsible persons to help monitor the patient upon dismissal from an ambulatory procedural setting does not come without potential hardship. It may require these individuals to take time off from work and rearrange family responsibilities, all with potential economic and social burden. Furthermore, as the US population ages, there are increasing numbers of older patients who have no one available to accompany them. For hospitals and ambulatory surgery centers, securing an escort can also lead to delays and cancellations.

Since 2012, our institution has used a program known as sedation dismissal process

(SDP) to enable patients who arrive without a designated escort to still undergo their outpatient procedure under anesthesia. Many of our patients travel from afar for routine medical evaluation and end up needing a procedure that requires sedation and/or anesthesia care. If these patients have traveled alone, in the past, these procedures had to be canceled or rescheduled to a later time when the patient could bring along a responsible adult for accompaniment postprocedure. The SDP program allows the unaccompanied patient to have his or her procedure even if alone. Information about this program is detailed in the patient's preoperative education materials. If the patient is staying at a hotel, the patient must check to see whether shuttle service is offered to/from the hospital. A hotel shuttle bus is considered safer than taxi or ride-share services because the destination is fixed in advance, and monetary transaction is not needed. If the patient's hotel does not offer this service, the patient may still stay at the hotel, but needs to make arrangements with a medical transport service postprocedure to return to the hotel. Medical transport service ensures that the driver is competent in assisting patients safely to their destination and that they have passed security background checks. Medical transport services also provide door-to-door service for the patient, which is important to ensure that the patient safely arrives inside of their residence, instead of taxi or ride-share services, which may drop the patient off at the sidewalk.

The patient also has the option to hire a nonlicensed care provider such as a nurse's aid or patient care assistant to provide transport and other comfort/safety check measures at the hotel postprocedure. If the patient resides close by, a friend/family member can also transport the patient home and get them settled. The driver's phone number is contacted *before* the intake process and the nurse verifies that the driver is available to pick up the patient and transport them home.

On the day of the procedure, if a patient arrives unaccompanied, the intake or charge nurse will work with the patient to ensure that they have the proper arrangements with an SDP hotel that offers shuttle service, a family member/friend to take them home postprocedure, or a nonlicensed care provider

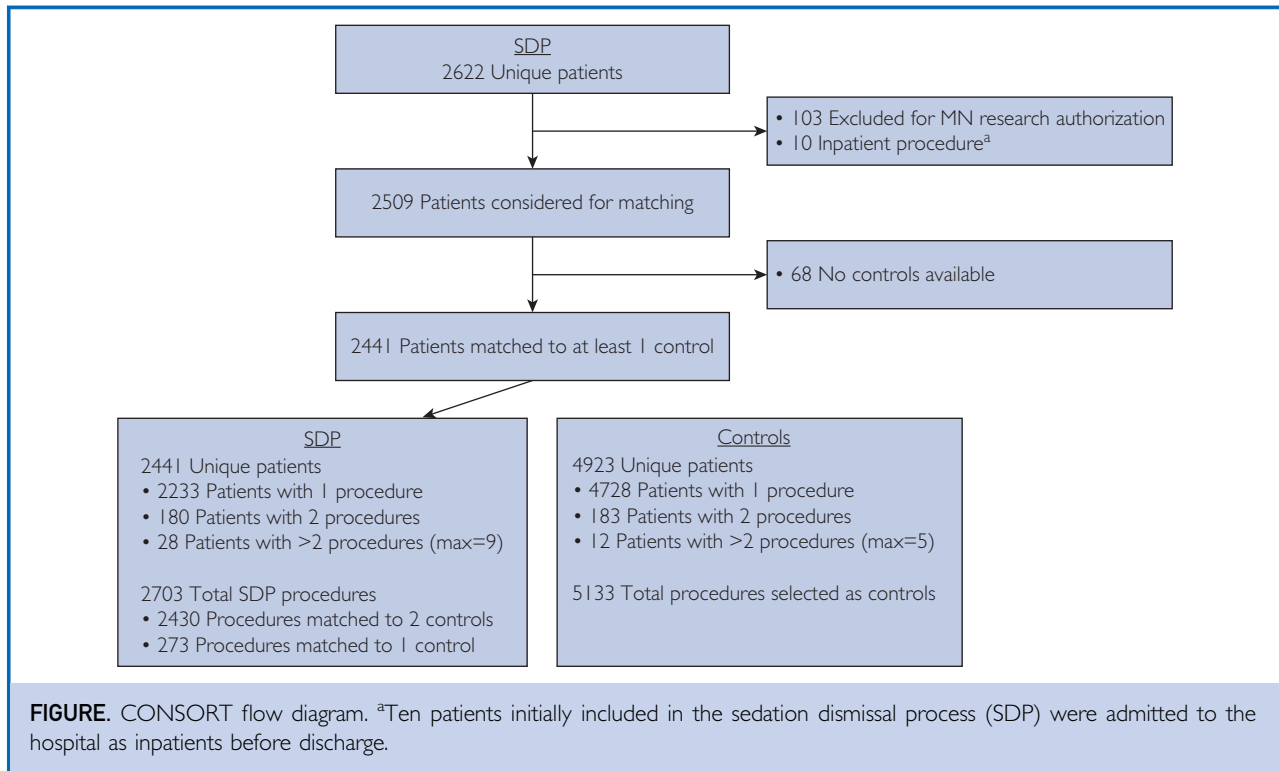
such as a nurse's aid or patient care assistant. If a proper resource is identified, the SDP process is initiated and a wristband is used to identify the patient as SDP. A series of consistent hand-offs ensures that patients are safe until they are in their hotel or residence after a procedure.

Although we have anecdotal evidence that no patients have suffered major adverse events since implementation of the SDP program, the purpose of this study was to test the hypothesis that patients dismissed alone have no greater risk of adverse outcome compared with those who are dismissed with a responsible adult.

PATIENTS AND METHODS

This study was approved by the Mayo Clinic Institutional Review Board. Inclusion criteria were age 18 years or older and completion of same-day elective, diagnostic, or therapeutic procedures involving patients approved for the SDP program between June 1, 2012, and March 31, 2017, retrospectively identified using an institutional electronic patient and procedure tracking program. For patients undergoing multiple procedures during the time frame, all encounters were included for review. Patients who were younger than 18 years or denied Minnesota research authorization (Minnesota Statute 144.335) were excluded. Patients admitted to the hospital postoperatively were also excluded from the study. Each encounter was matched with 1 to 2 control encounters on the basis of date of surgery (within 4 years), procedure, patient age (within 10 years), type of anesthesia/sedation, and the American Society of Anesthesiologists (ASA) physical status (1 or 2 vs 3 or 4 vs unknown). Control encounters were selected without regard to patient identification, so that a patient was allowed to be selected as a control for multiple encounters.

Unplanned readmission within 96 hours was defined as either unplanned hospital admission or unplanned visit to the emergency department within 96 hours of the procedure. For each procedure included in the analysis, all hospital and emergency department admissions within 96 hours were identified using an institutional electronic record research data program. Follow-up was truncated for patients who returned for a planned hospital admission



or procedure. Unplanned readmissions within 24 hours were also compared between groups. The 96-hour follow-up provides a more sensitive measure, whereas 24 hours is likely to be more specific for detecting complications related to a procedure.

Each admission was randomly assigned to 2 of the physician authors with the SDP status blinded. Each author reviewed the chart and determined independently whether the admission was unplanned and related to the previous procedure. Complications possibly related to the procedure were defined in advance and included acute myocardial infarction, syncope, postprocedural nausea and vomiting, cerebral vascular accident, motor vehicle accident, respiratory failure, altered mental status, cardiac arrhythmia, or death. If the 2 reviewers' opinions differed, the case was discussed among both reviewers with an additional physician author to make a final determination.

Patients' demographic characteristics and procedure characteristics were collected and summarized as mean \pm SD for continuous variables and n (%) for categorical variables

according to the SDP status. Unplanned readmissions and unplanned procedure-related readmissions within 24 and 96 hours were compared between study groups using generalized estimating equations accounting for the matched set design.

RESULTS

We identified 2622 unique patients who participated in the SDP. After exclusions for Minnesota research authorization and age, there were 2509 patients who had 2800 procedures. Each of these encounters was considered for matching (Figure). Of the 2509 patients, 68 (2.7%) were excluded from the study because of a lack of appropriate matched control. Thus, this study includes 2441 SDP patients undergoing 2703 procedures. Of the 2441 unique patients, 91% (n=2233) had a single procedure in the time frame, 7% (n=180) had 2 procedures, and 1% (n=28) had 3 or more procedures. Matched controls included 5133 procedures in 4923 unique patients. Ninety-six percent (n=4728) of the 4923 control patients had a single procedure selected, 4% (n=183) had

2 procedures selected, and less than 1% (n=12) had 3 or more procedures selected.

Sixty-three percent of SDP procedures were performed on men (Table 1). Average age of patients undergoing procedures approved for SDP was 61±13 years, 37% were ASA physical status 1 or 2, and 78% were performed under either monitored anesthesia care or sedation. Type of procedure was most often general surgery, orthopedic, urology/gynecology, or ophthalmology (35%, 15%, 13%, and 10%, respectively).

Overall 78 (1%) procedures were followed by an unplanned readmission within 96 hours. There was no difference in the rate of unplanned readmission between control and SDP procedures (50 [0.97%] in controls and 28 [1.04%] in SDP cases; $P=.79$) (Table 2). The rate of unplanned readmission judged to be related to the procedure was 0.11% (n=9), and there was no difference between controls and SDP (7 of 5133 [0.14%] in controls and 2 of 2703 [0.07%] in SDP; $P=.45$). Similar results were seen at 24 hours for overall admissions (0.53% in controls compared with 0.37% in SDP; $P=.34$) and unplanned readmissions related to the procedure (0.12% in controls compared with 0.07% in SDP; $P=.58$).

DISCUSSION

The findings of our study suggest that patients undergoing outpatient sedation or anesthesia are at very low risk of complications that require unexpected hospital admission or visits to the emergency department when following an established protocol. Previously, patients have been instructed that they should have a responsible person available to escort them from their procedure and be available to help with their care for 24 hours after their procedure.⁵ With proper preparation, the use of more short-acting anesthetic/sedation medications, and sound clinical judgment, this axiom may no longer be true.

The American Society of Anesthesiologists provides applicable guidance on discharging patients from both ambulatory and office-based practices stating that patients receiving anything other than local anesthetic must be discharged with a responsible person.^{6,7} In Europe, The Royal College of Anaesthetists Guidelines for the Provision of Anaesthesia

TABLE 1. Demographic Characteristics and Procedure Categories^{a,b}

Characteristic	Control (N=5133)	SDP (N=2703)
Age (y)	61.2 ± 12.9	61.1 ± 13.0
Sex, n (%)		
Male	3258 (63)	1718 (64)
Female	1875 (37)	985 (36)
General anesthetic, n (%)	654 (13)	317 (12)
Procedure category, ^c n (%)		
General	1846 (36)	939 (35)
Orthopedic	748 (15)	401 (15)
Urology/gynecology	695 (14)	356 (13)
Ophthalmology	548 (11)	278 (10)
Outfield	319 (6)	163 (6)
Cardiac catheterization	187 (4)	125 (5)
Radiology	178 (3)	100 (4)
Cardiac/cardi thoracic	120 (2)	66 (2)
Interventional pain	121 (2)	61 (2)
Vascular	48 (1)	29 (1)
Oral	47 (1)	27 (1)
Thoracic	22 (0)	16 (1)
Neurological	16 (0)	10 (0)
Other	238 (5)	132 (5)

^aASA = American Society of Anesthesiologists; PS = physical status; SDP = sedation dismissal process.

^bData presented are mean ± SD for continuous variables and n (%) for categorical variables.

^cCharacteristics shown were used to match controls to SDP patients with the exception of general anesthetic. Procedure category is a further categorization of the procedure types used for matching. The ASA PS category was used for matching but is not shown; 68% were ASA PS 1-2 and 32% were ASA PS 3-4.

Services and Guidance on the Provision of Anaesthesia Services for Day Surgery 2016 also state that patients receiving a general anesthesia must be escorted home with a responsible adult who should provide support for the first 24 hours after surgery.⁸ However, both federal and some international standards are more flexible in allowing physician judgment when deciding on whether patients must leave with an escort.^{4,9} Furthermore, the ASA Guidelines for Ambulatory Anesthesia and Surgery, Postanesthetic Care, and Office-Based Anesthesia all affirm that the literature may be insufficient in its support of “escorts” for patients having received an anesthetic.³

Our results also found that there was no difference in the risk of events seen between patients who left with an escort who was familiar to them (family member or friend) and those who were escorted through the SDP process. Although we did not explore the types of medications used in each case, most patients in our study underwent RN

TABLE 2. Comparison of Events Between Patients With SDP and Controls^{a,b}

Event	Control (N=5133)		SDP (N=2703)		P value
	n (%)	95% CI	n (%)	95% CI	
Event within 96 h					
Unplanned readmission	50 (0.97)	0.72%-1.28%	28 (1.04)	0.69%-1.49%	.79
Unplanned procedure-related readmission	7 (0.14)	0.05%-0.28%	2 (0.07)	0.01%-0.27%	.45
Event within 24 h					
Unplanned readmission	27 (0.53)	0.35%-0.76%	10 (0.37)	0.18%-0.68%	.34
Unplanned procedure-related readmission	6 (0.12)	0.04%-0.25%	2 (0.07)	0.01%-0.27%	.57

^aSDP = sedation dismissal process.

^bData are summarized as n (%) with exact 95% binomial CIs. P values are from generalized estimating equations accounting for the matched set design. Unplanned admission is defined as either unplanned hospital admission or unplanned visit to the emergency department within 96 h. Some patients presented to the emergency department and were subsequently admitted to the hospital and these were counted as a single event. For 5% of patients, follow-up was truncated at the time of a scheduled return visit occurring within 96 h.

moderate sedation or anesthesia monitored anesthesia care for their procedures. Advances in the shorter-acting medications used in outpatient anesthesia may have had an effect on these positive outcomes.⁵ Studies looking at the combination of fentanyl, propofol, and desflurane have shown equivalence to driving under the influence of alcohol.⁴ Sinclair et al² reported that driver simulation parameters after propofol and fentanyl induction and maintenance of general anesthesia with desflurane and nitrous oxide for 30 minutes were no different than controls at 2, 3, 4, and 24 hours postanesthesia.² Chung et al¹⁰ found that a general anesthetic with midazolam, propofol, fentanyl, nitrous oxide, and either sevoflurane or desflurane decreased overall driver simulation performance and increased sleepiness and fatigue at 2 hours but not at 24 hours, the only end points measured. Interestingly, lane accuracy positioning improved 2 hours postanesthetic. Using target controlled infusions, Telles et al¹¹ found that short use (<1 hour) of propofol impaired driving simulation performance up to 50 minutes in duration. Lichtor et al¹² suggest that active measurements, such as both cognitive and psychomotor testing, may not accurately assess the duration of anesthetic impact on alertness and sleepiness that patients often report. Instead, they suggest a passive test measuring time from awake state to asleep state (multiple sleep latency test), as a more sensitive indicator of medication effect on patient function after sedation.¹² In their study comparing

combinations of propofol, fentanyl, and midazolam among ambulatory surgery patients, midazolam had the greatest impact on shortening latency times, reflecting a greater impact on psychomotor performance deficits. Propofol alone or in combination with fentanyl had the least impact on sleep latency changes. The greater impact of midazolam on prolonged psychomotor function shown by Lictor et al¹² is consistent with previous studies.¹³⁻¹⁵ Although more studies are needed, most evaluations of psychomotor testing after typical outpatient anesthetic use (propofol, sevoflurane, desflurane) show a return to baseline measurements within 4 to 6 hours.^{5,16} Careful attention to limiting the use of midazolam may help to further accelerate patient recovery from an outpatient anesthetic.⁵

Anesthesiologists and patients alike may fail to comply with guidelines and other restrictions that they feel may be overly cautious, especially when patients undergo monitored anesthesia care in contrast to a general anesthesia. An early study out of Scotland reported that 31% of patients receiving general anesthesia were allowed to leave the hospital without an escort.¹⁷ Friedman et al found that 11% of Canadian Society of Anesthesiologists in a 2004 survey stated that they would feel comfortable anesthetizing unescorted patients for outpatient procedures.¹⁸ A year later, Chung et al¹⁹ relayed that 0.2% of patients arriving at a tertiary care institution for outpatient surgery over a 38-month period had no escort. Most of these patients

underwent surgery, left without an escort, and suffered no increase in measured postdischarge complications compared with patients discharged with an escort. In contrast to these reports involving no escort at all after their procedure, the SDP program we have implemented added a further degree of safety in that patients are provided assistance and handed off to responsible individuals as they are transported to their home or hotel and with this additional surveillance there were no untoward events identified.

It has been suggested by some that being accompanied by a responsible person after anesthesia may not only reduce adverse outcomes but also increase patient comfort and satisfaction.³ Whether this is intended to mean being cared for 24 hours or simply being discharged with a responsible person is unclear. Nonetheless, over the length of our study analysis, a total of only 9 patients leaving under the SDP program filed concerns with our institutional complaint department and none related to discharge issues after their procedure.

Patients participating in the SDP program are instructed to follow the same restrictions that are provided to all patients receiving anesthesia for their procedures, including not driving for 24 hours. In the earlier study describing Scottish patients allowed to leave the hospital without an escort, 81% remembered being instructed not to drive within 24 hours yet 9% drove themselves home, 21% drove within 12 hours, and 43% within 24 hours.¹⁷ A later survey of 750 patients found that 4% of patients drove within 24 hours of discharge.²⁰ A survey of patients in Britain undergoing outpatient surgery reported that although all 240 patients remembered having received instructions on activities to avoid over the next 24 hours, 4.1% still drove.²¹ Because it is not possible to predict whether certain patients will involve themselves in risky behaviors once they leave the hospital or ambulatory surgery center, it is most important to provide clear written and verbal instructions that define certain activities that patients should not engage in regardless of what specific discharge practices are implemented.

Several limitations in our study warrant discussion. Although this is the largest

cohort ever reported comparing accompanied to unaccompanied discharge, the relatively small number of patients limits the power with which we can conclude that the practice is safe. The risk of serious health events requiring immediate attention after outpatient anesthesia or sedation is overall very small, so continued evaluation of discharge processes such as SDP will need to occur to ensure patient safety. Furthermore, because this study was retrospective in nature, advances in anesthesia and sedation (eg, use of shorter-acting agents) addressed previously may result in differences over time. To help limit this potential error, SDP procedures were matched to procedures (controls) occurring with 4 years of each other.

CONCLUSION

Our results found that the SDP, a protocolized approach to patients without a designated escort to undergo procedures requiring anesthesia or sedation, did not increase rates of unplanned hospital readmission or emergency department visits over 24 or 96 hours. Our results found that with proper preparation, short-acting anesthetic/sedation medications, and sound clinical judgment, the presence of a responsible adult escort is not associated with reduced risk following discharge after ambulatory anesthesia. This practice may lessen the hardships reported by patients in needing to obtain an escort and the inconveniences and delays experienced by ambulatory procedural facilities when patients arrive without a designated escort.

Abbreviations and Acronyms: ASA = American Society of Anesthesiologists; SDP = sedation dismissal process

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