Improving patient care in neurosurgery through postoperative telephone calls: a systematic review and lessons from all surgical specialties

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OBJECTIVE Postoperative telephone calls are a simple intervention that can be used to improve communication with patients, potentially affecting patient safety and satisfaction. Few studies in the neurosurgical literature have examined the effect of a postoperative telephone call on patient outcomes, although several exist across all surgical specialties. The authors performed a systematic review and analyzed studies published since 2000 to assess the effect of a postoperative telephone call or text message on patient safety and satisfaction across all surgical specialties.

METHODS A search of PubMed-indexed articles was performed on June 12, 2021, and was narrowed by the inclusion criteria of studies from surgical specialties with > 50 adult patients published after 1999, in which a postoperative telephone call was made and its effects on safety and satisfaction were assessed. Exclusion criteria included dental, medical, and pediatric specialties; systematic reviews; meta-analyses; and non-English-language articles. Dual review was utilized.

RESULTS Overall, 24 articles met inclusion criteria. The majority reported an increase in patient satisfaction scores after a postoperative telephone call was implemented, and half of the studies demonstrated an improvement in safety or outcomes.

CONCLUSIONS Taken together, these studies demonstrate that implementation of a postoperative telephone call in a neurosurgical practice is a feasible way to enhance patient care. The major limitations of this study were the heterogeneous group of studies and the limited neurosurgery-specific studies.

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KEYWORDS telephone call; postoperative follow-up; patient satisfaction

PATIENT satisfaction and safety outcomes are two commonly assessed quality indicators in the delivery of medical care, and hospital systems and physician groups are continually striving for excellence in these categories. While there are many ways to improve these metrics, increased communication is one simple intervention. This can be achieved with a postoperative telephone call or text message.¹⁻³ In postoperative patient care, a simple telephone call can answer any questions or concerns that have arisen since discharge, potentially saving time and healthcare dollars.

There are a limited number of studies in the neurosurgical literature that have evaluated the effect of a post-

operative telephone call on patient outcomes; however, other surgical specialties have explored this topic. We conducted a systematic review of all studies published in any surgical specialty exploring the relationship between a postoperative telephone call and patient satisfaction and/or safety.

Methods

This study was conducted following the guidelines of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) to investigate the role of a postoperative follow-up telephone call or text message. The

ABBREVIATIONS PRISMA = Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

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FIG. 1. PRISMA flowchart for systematic review of studies assessing the effect of postoperative telephone calls or text messages on patient satisfaction and/or safety. Data added to the PRISMA template (from Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71. doi: 10.1136/bmj.n71) under the terms of the Creative Commons Attribution License.

PubMed database was accessed on June 12, 2021, and queried for a literature search from January 2000 to June 2021. We did not register any systematic review protocol for the current review. The database was queried with the following term: ["post-operative" OR "surgical" OR "post-op" OR "surgery"] AND ["telephone" OR "phone" OR "call"]. Restrictions were applied to the English language. The literature search was performed by two authors (D.G. and J.A.K.). Any discrepancies between the article inclusion were resolved by mutual agreement. Risk for bias within the studies was assessed by using strict inclusion and exclusion criteria as well as dual review.

Following the literature search, all duplicates were excluded. The remaining articles were screened by title and the content of the abstract. The inclusion criteria for the articles were 1) surgical specialty, 2) > 50 patients, 3)

patient age > 18 years, 4) published after 1999, 5) clinical trial or randomized controlled trial, 6) performance of an outpatient or inpatient surgical procedure, and 7) a telephone call or text message to patients within 3 months after the procedure.

Patient Satisfaction or Safety Was Evaluated

We excluded any systematic reviews and meta-analyses, non-English-language articles, dental specialties, pediatric series, and medical specialties. See Fig. 1 for the full PRISMA flowchart.

Outcomes sought within the literature review included patient satisfaction scores or survey results; patient safety data, including readmission rates, infection rates, and death; and patient outcomes after surgical intervention.

Results

The search criteria revealed a total of 5401 articles. After excluding duplicate articles ($n = 10$) and irrelevant articles, another 3990 articles were excluded. A total of 1401 articles were included for review of the abstract. After reviewing the abstract, a total of 64 relevant articles were found. The full text of these articles was reviewed. After applying the final inclusion criteria, 24 studies were included in the final analysis. Details of the included studies can be found in Table 1.

Of 24 studies, only 2 were from neurosurgical specialties. The mean sample size of the studies was 181.97 patients (SD 258.91 patients). The mean patient age was 54.05 years (SD 12.89 years). Most studies were randomized controlled trials (76.9%), and the remainder were prospective/clinical trials. The mean time frame for postoperative communication was 57.17 days (SD 89.12 days). The most common person making the telephone calls was the nurse (41.7%), followed by the physician (29.2%). The mean response rate was 89.8% (SD 11.3%). Outpatient surgery was the most common type to use telephone follow-up (52.7%). Patient satisfaction outcomes were measured in 43.4% of the studies. In the studies in which patient satisfaction was measured, most studies (70%) reported that the telephone call follow-up was associated with higher patient satisfaction rates. Of the 24 studies included, 22 assessed patient safety and outcomes data. Of these, 11 found no difference in their primary outcomes, 11 found a positive effect from the telephone call, and no studies found a negative effect from the addition of a telephone call. Two of the studies were conducted within the neurosurgery specialty, and these were compared to the rest of the data (Table 2).

Discussion

In this systematic review of the literature, including all surgical specialties, we found that a postoperative telephone call improved patient satisfaction in most studies and enhanced patient safety or clinical outcome in half of the reviewed studies.

Several studies in this systematic review demonstrated increased patient satisfaction after implementation of a postoperative telephone call. For example, Caljouw and Hogendorf-Burgers implemented a nurse telephone call to outpatient gynecological surgery patients on postoperative days 3 through 9 and found a significant increase in patient satisfaction scores compared with patients who received standard care.²² Similar results were described following a laparoscopic appendectomy and cholecystectomy for patients who received a surgery resident call 2 weeks after surgery.¹³ Interestingly, in that study, the patients who received a call did not attend an in-person clinic follow-up. Although some might feel that losing face-to-face interaction could harm satisfaction scores, this study provides evidence that it may result in higher satisfaction.

Patient safety and outcomes in the postoperative period can be assessed clinically and through measures such as complication rates, use of emergency and urgent care facilities, and readmission rates. While different surgeries require different postoperative care, measuring outcomes through these measures can be a good standard to assess

the quality of care in these areas. Our data revealed that 11 of 22 studies that assessed patient safety and outcomes positively changed from telephone call implementation. Carrier et al. found that the addition of a text message on days 1, 3, and 5 after discharge to patients who underwent colorectal surgery versus standard care led to a decrease in patient-initiated contacts as well as detecting two early, potentially severe complications that eventually led to reoperation, thus improving patient safety.¹⁶ Postoperative telephone calls may also improve safety and outcomes by increasing compliance with postoperative directives. A study that investigated patients who underwent outpatient shoulder surgery and received a telephone call 3 times weekly for a month after surgery resulted in those patients in the call group having better adherence to prescribed physiotherapy and better range-of-motion outcomes.¹¹

Overall, 11 of 22 studies that assessed patient safety and outcomes after the addition of a telephone call reported no significant difference in these measures. For instance, Thompson et al. described a trial comparing telephone call follow-up with standard care in patients who underwent pelvic surgery.¹⁰ The authors did not find any differences between the two groups in patient safety, outcomes, or satisfaction scores.

There are few drawbacks to implementing a postoperative call protocol to surgical practice, but increased patient care time and, by extension, expense are two to consider. There is also a question as to how closely patient satisfaction is linked to quality of care. Berkowitz et al. described the unclear relationship between Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) scores and quality of care.²⁶ Patient satisfaction and safety are also directly tied to hospital reimbursement under the Affordable Care Act.²⁷ Satisfaction scores can be influenced by expectations of care, communication with physician and staff, responsiveness of physician and staff, cleanliness, timeliness of telephone calls, appointments and results, and attire.²⁸ Addressing the factors that healthcare providers can influence is a crucial first step in improving scores and perceived outcomes.

Postoperative telephone calls can be a potential liability if the call is improperly handled. In the case of *Flanagan v Southside Hospital*, the plaintiff received a telephone call from her surgeon's office after an uneventful bilateral tubal ligation.²⁹ She was discharged the same day of surgery and the call was received the following day. She complained of abdominal pain, and the nurse making the call advised the patient to call her surgeon directly. The patient did not make a follow-up call and instead waited a few days until her symptoms sent her back to the hospital with an eventual bowel resection and colostomy. The plaintiff sued the surgeon, nurse, and hospital for lack of informed consent.

Decisions made in the *Flanagan v Southside Hospital* case left 85% of the responsibility with the plaintiff as she did receive informed consent; however, 15% of the responsibility was placed on the nurse who made the telephone call. While the nurse did document that she urged the patient to contact the provider, the court concluded that it was the nurse's responsibility to inform the provider directly of the telephone encounter as she was not in a position to make decisions regarding the patient's care. Analysis of the case

TABLE 1. Systematic review of postoperative telephone calls

Authors & Year	RCT vs P	Surgical Specialty	Sample Size	Mean Age (yrs)	IP vs OP	Communication Type	Time Frame	Caller Title	Response %	Outcome	Pt Satisfaction
Massoumi et al., 2020 ⁴	P	General	276	18	OP	TC	Before POD 4	MD	100	No difference	Not assessed
Shah et al., 2021 ⁵	P	ENT	83	58.8	IP	TC	<72 hrs post-DC	MD	91	Fewer ED visits	Not assessed
Oestergaard et al., 2020 ⁶	RCT	NSGY	41	40.5	IP	TC	2, 4, 6, & 10 wks postop	Case manager	100	No difference	Not assessed
Feldacker et al., 2020 ⁷	RCT	Urology	362	25	OP	TC	Daily × 14 days	Nurse	92.5	No difference	Not assessed
Taylan & Akil, 2019 ⁸	RCT	General	35	51	IP	TC	1, 2, & 4 wks	Counselor	100	Not assessed	Increased for pts in call group
Vance et al., 2019 ⁹	RCT	Derm	51	67	OP	TC	POD 1	MD	100	No difference	No difference
Thompson et al., 2019 ¹⁰	RCT	OBGYN	51	58	OP	TC	2, 6, & 12 wks postop	Nurse	96	No difference	No difference
Martinez-Rico et al., 2018 ¹¹	RCT	Ortho	36	32	OP	TC	3/wk for 1 mo	Nurse	100	Better ROM outcomes	Not assessed
Iwanoff et al., 2019 ¹²	P	OBGYN	233	59	OP	TC	48–72 hrs post-DC	MD	100	Not assessed	Not assessed
Liu et al., 2019 ³	P	NSGY	490	55	IP	TC	48 hrs postop	Nurse	92	Decreased readmission rates	Not assessed
Ma et al., 2018 ¹³	RCT	General	76	35	OP	TC	2 wks postop	MD	93	No difference	Increased satisfaction
Szöts et al., 2016 ¹⁴	RCT	Ortho	59	67	IP	TC	PODs 4 & 14	NS	97	Short-term physical function improvements	NS
Malmström et al., 2016 ¹⁵	RCT	General	41	64	IP	TC	1/wk for 2 mos	MD	63	No difference	Increased satisfaction
Kummerow Bro-man et al., 2016 ²	P	General	118	60	OP	TC	POD 14	PA	88	No difference	Not assessed
Carrier et al., 2016 ¹⁶	P	General	111	53.5	IP	Text	Days 1, 3, & 5 post-DC	Auto-mated	90	Not assessed	Increased satisfaction
Palmen et al., 2016 ¹⁷	RCT	Ortho	24	50	OP	TC	6 mos postop	MD	79	Not assessed	No difference
Clari et al., 2015 ¹⁸	RCT	Ortho	110	47	OP	TC	24–96 hrs postop	Nurse	80	Fewer postop issues	Not assessed
Young et al., 2013 ¹⁹	RCT	General	387	68	IP	TC	PODs 3 & 10	Nurse	90	No difference	Not assessed
Zhang et al., 2013 ²⁰	RCT	General	59	53	IP	TC	PODs 3–7 & 14–20	Nurse	88	Less complications	Increased satisfaction
Visser et al., 2012 ²¹	RCT	Mixed	1395	55	Both	TC	POD 30	NS	64	No difference	Not assessed
Caljouw & Hogendorf-Burgers, 2010 ²²	RCT	OBGYN	251	18	IP	TC	PODs 3–9	Nurse	92	No difference	Increased satisfaction
Kimman et al., 2010 ²³	RCT	General	150	56	IP	TC	3, 6, & 9 mos postop	Nurse	100	Not assessed	No difference
Hørdam et al., 2010 ²⁴	RCT	Ortho	93	75	IP	TC	4 wks, 3 mos, & 6 mos postop	Nurse	70	Increased health status	Not assessed
Tranmer & Parry, 2004 ²⁵	RCT	Cardiac	102	65	IP	TC	Weekly × 4 wks	NP	89	No difference	Not assessed

Cardiac = cardiothoracic surgery; DC = discharge; derm = dermatology; ED = emergency department; ENT = otolaryngology; IP = inpatient; MD = medical doctor; NP = nurse practitioner; NS = not specified; NSGY = neurosurgery; OBGYN = obstetrics-gynecology; OP = outpatient; ortho = orthopedic surgery; P = prospective; PA = physician assistant; pt = patient; POD = postoperative day; RCT = randomized controlled trial; ROM = range of motion; TC = telephone call.

reveals that the nurse could have been absolved of liability if she had simply explained the risks of not following up and criteria for emergency care and ensured that the patient knew it was her own decision from that point forward.³⁰ Had the patient been uncertain, she would have erred on the side of safety by calling her gynecologist or returning to the hospital. If the patient decided not to, it would have been her decision and hers alone. Conversely, if the nurse had documented that she only clarified the discharge instructions and let the patient decide how to proceed, she would have been held equally liable as the plaintiff in this case.

An emerging form of communication, particularly in the era of COVID-19, is video conferencing through various telemedicine platforms. Use of telemedicine by spine surgeons has grown from 10% to more than 39% of all visits during the COVID-19 pandemic.³¹ Some studies have shown that telemedicine visits can be as effective as in-person visits in an orthopedic patient population.³² Although the cases of many neurosurgical patients may be more complicated and require in-person neurological examinations, postoperative telemedicine check-ins may prove to be a feasible option for routine procedures in uncomplicated cases. However, telemedicine technology is not without its problems. Up to 50% of telemedicine users have experienced technical difficulties during at least 15% of visits.³¹ When implemented correctly, however, it can be a useful adjunct to in-person visits while maintaining safety. A 2021 systematic review by Ng et al. found that surgical site infections could be diagnosed via telemedicine 70% to 100% of the time compared with in-person examinations.³² As telemedicine becomes more widely used, its feasibility and safety will become apparent.

Limitations

Our study has some significant limitations. The studies included were highly heterogeneous, precluding us from performing a meta-analysis. Due to the dearth of studies in the neurosurgical literature, we broadened our search to include all surgical specialties and recognize that outcomes may not be entirely generalizable. Although we felt that we had broad search criteria, it is possible that there may be some studies that were missed in this systematic review. Despite these limitations, we attempted to objectively study the impact of a postoperative telephone call on patient outcomes to evaluate whether implementation of such a practice may improve neurosurgical outcomes. Although we do not provide any novel data, we hope neurosurgeons will find this review of the available literature useful. In light of the pandemic, use of technology (telephone call or telemedicine) will soon become a standard practice across all specialties.

Conclusions

Postoperative telephone calls can provide meaningful change to patient satisfaction scores and patient safety and outcomes. While there is a paucity of data in the neurosurgical field, many other surgical specialties have found postoperative telephone calls to be beneficial. With strong evidence to support an increase in patient satisfaction, and some improvement in patient outcomes and safety, imple-

TABLE 2. Study characteristics compared between neurosurgery and all other specialties

Variable	Neurosurgery	Other Surgical Specialties	p Value
Type of study, %			
RCT	50	77.2	
Prospective	50	22.9	
Mean sample size (SD)	265.50 (317.4)	176 (260.22)	0.777
Mean age, yrs (SD)	50.55 (6.29)	54.32 (13.3)	0.349
Type of op, %			
IP	100	50.9	
OP		45.9	
Mixed		4.1	
Type of communication, %			
Phone call	100	85.7	
Text message		7.1	
NA		7.1	
Time to contact, days			
Mean (SD)	36 (48)	47.86 (82.59)	0.802
Median	36		
Caller, %			
Physician		25	
Nurse	50	37.5	
Other	50	12.5	
Mean % responders (SD)	96 (5.6)	90.27 (11.07)	0.457
Patient satisfaction assessment, %			
Higher in pt call group		28.6	
No difference		10.7	
Not assessed		60.7	

NA = not available.

mentation of a postoperative telephone call can be a simple way to impact neurosurgical patients in a positive manner.

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Conception and design: Goehner, Kosty. Acquisition of data: Goehner, Kosty. Analysis and interpretation of data: Goehner, Kandregula, Birk. Drafting the article: Goehner, Kandregula, Birk. Critically revising the article: Guthikonda, Goehner, Carroll, Kosty. Reviewed submitted version of manuscript: Guthikonda, Goehner, Carroll, Kosty. Statistical analysis: Goehner, Kandregula, Birk. Administrative/technical/material support: Goehner. Study supervision: Kosty.

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