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Disclosure of Risks Associated With Regional Anesthesia: A Survey of Academic Regional Anesthesiologists

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Background and Objectives: In view of the relatively few large studies available to estimate the rates of complications following regional anesthesia, we aimed to identify and quantify the risks that academic regional anesthesiologists and regional anesthesia fellows disclose to their patients before performing central and peripheral nerve blockade.

Methods: We asked 23 North American regional anesthesia fellowship program directors to distribute a questionnaire to the regional anesthesiologists and regional anesthesia fellows at their institutions. The questionnaire was designed to capture the risks and corresponding incidences that are routinely disclosed to patients before performing the most common central and peripheral nerve block techniques.

Results: The total number of respondents was 79 from 12 different institutions. Fifty-eight (74%) respondents disclose risks of regional anesthesia in order to allow their patients to make an informed choice, whereas 20 (26%) disclose risks for medicolegal reasons. For central neural blockade, the most commonly disclosed risks are headache, local pain/discomfort, and infection. For peripheral nerve blockade, the most commonly disclosed risks are transient neuropathy, local pain/discomfort, and infection. For both central and peripheral nerve blockade, the risks most commonly disclosed are also those with the highest-reported incidences.

Conclusions: The risks of regional anesthesia most commonly disclosed to patients by academic regional anesthesiologists and regional anesthesia fellows are benign in nature and occur frequently. Severe complications of regional anesthesia are far less commonly disclosed. The incidences of severe complications disclosed by academic regional anesthesiologists and their fellows can be inconsistent with those cited in the contemporary literature. *Reg Anesth Pain Med 2007;32:7-11.*

Key Words: Adverse effects, Anesthesia, Epidural, Spinal, Nerve block, Postoperative complications.

Complications after regional anesthesia (RA) are uncommon. Unfortunately, prohibitively large numbers of patients are required for study in order to capture the true incidences of such complications.[1] The American Society of Anesthesiologists (ASA) Closed Claims Project provides the largest collection of adverse events associated with modern RA practice in the United States;[2] however, the lack of a denominator prevents the calculation of incidence. The objective of this study is to identify and quantify the risks of RA that are routinely disclosed by academic regional anesthesiologists and their RA fellows to patients in North American teaching hospitals. The information gathered may complement the relatively limited data available in the contemporary literature to produce a more accurate representation of the risks associated with RA and allow other anesthesia practitioners to draw on the experience of experts during preoperative discussions with their patients. Our hypothesis was that academic regional anesthesiologists and RA fellows

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Accepted for publication July 25, 2006.

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1098-7339/07/3201-0001$32.00/0
doi:10.1016/j.rapm.2006.07.005

routinely disclose all significant risks and corresponding incidences to their patients before performing central (CNB) or peripheral nerve blockade (PNB).

Methods

After institutional review board approval (University Health Network, Toronto, Ontario, Canada), an information letter and questionnaire were sent by electronic mail to all identifiable regional anesthesia fellowship program directors in North America on November 7, 2005. Twenty-three program directors were identified from the Regional Anesthesia Fellowship Program listings on the American Society of Regional Anesthesia and Pain Medicine website (www.ASRA.com) as well as the recently published guidelines for RA Fellowship training.[3] The program directors were asked to distribute the questionnaire to "all practicing regional anesthesiologists and RA fellows" at their home institutions and then return the completed questionnaires by mail or facsimile. After 8 weeks, a reminder message was sent by electronic mail to those program directors who had not yet responded to the initial request.

The questionnaire was primarily designed to capture the risks and corresponding incidences that are routinely disclosed by the respondents to their patients prior to performing the most common CNB and PNB techniques. From a list of complications for each CNB and PNB technique, the respondents were instructed to select which risks they routinely disclose to their patients and indicate the corresponding incidence that is disclosed along with each risk according to a 6-point scale: (1) "greater than 1:10," (2) "approximately 1:100," (3) "approximately 1:1,000," (4) "approximately 1:10,000," (5) "approximately 1:100,000," or (6) "less than 1:1,000,000." Respondents were encouraged to add any risks (and corresponding incidences) that did not appear in the list. Additionally, respondents were asked to select the "primary reason" for disclosing risks associated with RA from 2 options: (1) "to allow the patient to make an informed choice" or (2) "for medicolegal reasons." Finally, respondents were asked to select whether their institution required a "written consent form" for (1) "general anesthesia," (2) "regional anesthesia," (3) "combined (general/regional anesthesia)," or (4) none of the above.

Data analysis was undertaken using SAS Version 8.0 (SAS Institute Inc., Cary, NC). Categorical data were analyzed by using the chi-square test. Nonparametric data were analyzed by using the Mann-Whitney *U* test with the Bonferroni correction for multiple comparisons.

Results

The program directors from 12 institutions (9 American and 3 Canadian) replied and agreed to participate in this study. Seven program directors replied and agreed after the initial e-mail request, whereas 5 replied and agreed after the reminder e-mail request. No replies were received from the program directors of the remaining 11 institutions. The total number of respondents (questionnaires returned) was 79 (70 attending anesthesiologists and 9 RA fellows). Fifty-eight (74%) respondents answered that the primary reason for explaining regional anesthetic risks was to allow their patients to make an informed choice regarding anesthetic technique, whereas 20 (26%) answered for medicolegal reasons. Among the 12 participating institutions, 8 require a written consent form for anesthesia, whereas the remaining 4 institutions do not. For all 8 institutions that require a written consent form for anesthesia, both general anesthesia (GA) and RA are addressed in a single form. The risks and corresponding incidences routinely disclosed for spinal and epidural anesthesia are remarkably similar. For both spinal and epidural anesthesia, the most commonly disclosed risks are headache, local pain/discomfort, and infection (Table 1). Severe complications of CNB, such as paralysis, cardiac arrest, and death, are far less frequently disclosed. For PNB, the most commonly disclosed risks are transient neuropathy, local pain/discomfort, and infection (Table 2). The 2 exceptions are axillary block, where bruising is often disclosed (possibly reflecting the transarterial technique), and ankle block, where the risk of neuropathy is arguably rare. For both CNB and PNB, the risks most commonly disclosed are also those with the highest likelihood of occurrence among all incidences routinely disclosed by our respondents (Tables 1 and 2). When analyzed according to institutional country of origin (United States *v* Canada), there were no significant differences for any of the responses in the questionnaire.

Discussion

Neurological complications of RA can be severe and potentially devastating to patients and their families. Candid disclosure and accurate quantification of risks associated with RA are imperative to protecting both patients and anesthesiologists alike. Surprisingly, however, the results of our questionnaire suggest that relatively few regional anesthesiologists disclose the severe risks of RA. For exam-

Table 1. Risks of Neuraxial Blockade Disclosed by Regional Anesthesiologists

	Local Pain/Discomfort	Bruising	Infection	Headache	Transient Neurological Symptoms	Peripheral Neuropathy (transient)	Peripheral Neuropathy (permanent)	Paralysis	Seizures	Respiratory Failure	Cardiac Arrest	Death
Spinal anesthesia												
N	55	36	55	69	45	37	44	32	5	10	13	23
%	73	48	74	90	59	49	58	43	7	14	18	32
Incidence	1:10	1:10	$1:10^5$	$1:10^2$	$1:10^2$	$1:10^4$	$1:10^5$	$1:10^6$	$1:10^4$	$1:10^4$	$1:10^5$	$1:10^5$
Epidural anesthesia												
N	61	38	54	69	N/A	41	42	31	14	5	10	20
%	82	51	73	91		56	57	43	20	7	14	29
Incidence	1:10	1:10	$1:10^5$	$1:10^2$		$1:10^3$	$1:10^5$	$1:10^6$	$1:10^3$	$1:10^4$	$1:10^4$	$1:10^5$

N, number of respondents who routinely disclose specified risk; %, percentage of total responses who routinely disclose specified risk; incidence, incidence of specified risk routinely disclosed by respondents. The incidence is expressed as the mode calculated from all responses in aggregate; N/A, not applicable.

ple, only 58% and 43% of academic regional anesthesiologists routinely disclose the risks of permanent neuropathy and paralysis, respectively, to their patients undergoing CNB. Our survey did not enable us to determine why some anesthesiologists failed to disclose these risks. One possible explanation for this finding is the potential for discussions regarding anesthetic risk in the immediate preoperative period to exacerbate the patients' preoperative anxiety.[4] Additionally, previous studies that have examined which anesthetic risks patients would like to know about are conflicting.[5,6] Many patients prefer simple explanations about the main risks and benefits, although a considerable number of patients wish full-risk disclosure. Nonetheless, anesthesiologists have a duty to accurately disclose the significant risks of the proposed anesthetic to their patients, including those that happen relatively frequently (e.g., local pain/discomfort) as well as those that happen rarely but are severe in nature (e.g., permanent neuropathy and paralysis).

The complications of RA and their likelihood presented to the patient by the anesthesiologist likely influence the patients' choice of anesthetic technique for their surgery. Disclosing an inflated rate of complications may cause patients to opt for GA and forfeit the potential benefits of RA. Alternatively, failing to mention certain complications or deflating the rate of complications associated with RA may lead the patient to choose an RA technique when the patient would have chosen a GA had the risks been accurately disclosed. Importantly, among the anesthesiologists who do disclose the severe risks of CNB, specifically, permanent neuropathy, paralysis, respiratory failure, seizures, cardiac arrest, and death, the incidences disclosed are generally in keeping with those cited in the contemporary literature.[7-10] The single exception is seizures after CNB, which reportedly occur far less often (0.12-1.32:10,000)[7-9,11] than what is disclosed by our respondents. For PNB, the contemporary literature suggests that the incidence of severe complications is considerably less common than that disclosed by our respondents. For example, in 2 recent comprehensive prospective studies of complications after PNB, yielding 5,412 blocks in aggregate, there were no cases of permanent neuropathy, 1 case of seizure (1.8:10,000), and no cases of cardiac arrest or death.[12,13] Similarly, in the large and widely cited investigation of 43,552 PNBs (excluding lumbar plexus block) by Auroy and colleagues,[9] there were 5 cases of seizure (1.1:10,000) and no cases of cardiac arrest or death. Unfortunately, Auroy's study did not provide sufficient detail to determine the rate of permanent neuropathy after PNB. There are at least 2 possible explanations for the discrepancy

Table 2. Risks of Peripheral Nerve Blockade Disclosed by Regional Anesthesiologists

	Local Pain/Discomfort	Bruising	Infection	Horner's Syndrome	Peripheral Neuropathy (transient)	Peripheral Neuropathy (permanent)	Paralysis	Seizures	Pneumothorax	Respiratory Failure	Cardiac Arrest	Death
Interscalene block												
N	54	42	54	55	57	59	15	29	27	23	13	21
%	71	55	72	71	73	77	21	39	37	32	18	28
Incidence	1:10	$1:10^2$	$1:10^4$	1:10	$1:10^2$	$1:10^4$	$1:10^4$	$1:10^3$	$1:10^3$	$1:10^3$	$1:10^5$	$1:10^5$
Infraclavicular block												
N	45	39	45	N/A	47	43	N/A	17	29	N/A	11	18
%	69	60	70		72	66		28	46		18	30
Incidence	1:10	$1:10^2$	$1:10^4$		$1:10^4$	$1:10^5$		$1:10^3$	$1:10^3$		$1:10^5$	$1:10^6$
Axillary block												
N	55	55	51	N/A	54	51	N/A	21	N/A	N/A	12	18
%	75	76	70		73	70		30			18	26
Incidence	1:10	1:10	$1:10^4$		$1:10^4$	$1:10^4$		$1:10^4$			$1:10^4$	$1:10^5$
Femoral block												
N	51	46	54	N/A	54	48	N/A	18	N/A	N/A	12	19
%	68	62	73		71	63		25			17	27
Incidence	1:10	1:10	$1:10^4$		$1:10^4$	$1:10^4$		$1:10^4$			$1:10^4$	$1:10^5$
Popliteal block												
N	50	43	53	N/A	53	50	N/A	18	N/A	N/A	11	18
%	70	61	74		73	69		26			16	26
Incidence	1:10	1:10	$1:10^5$		$1:10^4$	$1:10^4$		$1:10^4$			$1:10^4$	$1:10^5$
Ankle block												
N	55	43	43	N/A	34	32	N/A	8	N/A	N/A	7	13
%	79	61	62		48	45		12			11	19
Incidence	1:10	1:10	$1:10^4$		$1:10^4$	$1:10^4$		$1:10^3$			$1:10^5$	$1:10^5$

N, number of respondents who routinely disclose specified risk; %, percentage of total respondents who routinely disclose specified risk; incidence, Incidence of specified risk routinely disclosed by respondents. The incidence is expressed as the mode calculated from all responses in aggregate; N/A, not applicable.

between the incidence of severe complications disclosed by our respondents and that reported in the literature. The first may be that regional anesthesiologists are less familiar with the contemporary literature than they should be. The second, perhaps more palatable explanation, is that much of the available literature is flawed, and the respondents are drawing on their own clinical experience to estimate and disclose the incidences of severe complications associated with RA. Indeed, the questionable validity of the available literature limits its role in guiding discussions of risk with patients. The largest contemporary studies of risk associated with RA are restricted to reviews of insurance claims[2,7,14] and self-reporting by anesthesiologists,[8-10] both of which can result in misrepresentation of risk.[1,15]

There are several important limitations of our study. First, because the distribution of our survey was left to the discretion of the program directors, we did not determine the total number of questionnaires distributed and therefore could not calculate a true "response rate." Moreover, the rate of reply by the program directors was only 12 out of the 23 programs identified; however, it is likely that some of the e-mail contact information gathered was outdated and/or the programs inactive or discontinued. Furthermore, although we recognize that the inclusion of RA fellows may have skewed our results, any such bias is likely minimal. Indeed, the number of RA fellow respondents was very low compared to the number of attending anesthesiologist respondents. We, nonetheless, believe that including RA fellows is important because fellows are often the ones charged with conducting the preoperative assessment and entering into discussions of risk with their patients; such discussions should faithfully reflect the practice of their expert instructors, namely the attending anesthesiologists. Finally, the incidence of some complications disclosed by our respondents may not be generalizable beyond teaching centers. For example, the incidence of headache routinely disclosed for either spinal or epidural anesthesia was curiously similar and questionably high.

In summary, our survey of risk-disclosure practices among academic regional anesthesiologists and RA fellows revealed that the most commonly disclosed risks of RA are benign in nature and occur frequently. Severe complications of RA are far less commonly disclosed. The incidences of severe complications disclosed by academic regional anesthesiologists and their fellows can be inconsistent with those cited in the contemporary literature.

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