

Intra-articular steroid hip injection for osteoarthritis: a survey of orthopedic surgeons in Ontario

John Kaspar, BSc(Hons);* Sam Kaspar, MD;† Cinzia Orme, BA;* Justin de V. de Beer, MD*

Background: Intra-articular steroid hip injection (IASHI) has been prescribed for painful hip arthritis since the 1950s, but with advances in medical and surgical management its role is less certain today. There are very few published data on the utility or prescribing patterns of IASHI. **Methods:** We developed a questionnaire to seek expert opinion on IASHI that we distributed to practising Ontario-based members of the Canadian Orthopaedic Association. We systematically describe the current practices and expert opinion of 99 hip surgeons (73% response rate), focusing on indications, current use and complications experienced with IASHI. **Results:** Only 56% of surgeons felt that IASHI was therapeutically useful, with 72% of surgeons estimating that 60% or less of their patients achieved even transient benefit from IASHI. One-quarter of the surgeons believe that IASHI accelerates arthritis progression, most of whom had stated that it would be no great loss if IASHI was no longer available. Nineteen percent of the surgeons believed that the infection rate related to total hip arthroplasty (THA) may be increased after IASHI, and this was associated with fewer IASHIs ordered per year, compared with the number prescribed by those who did not feel that infection rates would increase. **Conclusions:** This systematic collection of expert opinions demonstrates that substantial numbers of surgeons felt that, in their patients, IASHI was not therapeutically helpful, may accelerate arthritis progression or may cause increased infectious complications after subsequent THA.

Contexte : On prescrit depuis les années 1950 l'injection intra-articulaire de stéroïdes dans la hanche (IIASH) contre l'arthrite douloureuse de la hanche, mais son rôle est moins certain aujourd'hui avec les progrès du traitement médical et chirurgical. Il y a très peu de données publiées sur l'utilité de l'IIASH ou sur les tendances de l'établissement d'ordonnances à cet égard. **Méthodes :** Pour consulter les experts sur l'IIASH, nous avons créé un questionnaire que nous avons distribué à des membres de l'Association canadienne d'orthopédie actifs en Ontario. Nous avons décrit systématiquement les pratiques courantes et l'avis d'experts de 99 chirurgiens spécialistes de la hanche (taux de réponse de 73 %), en concentrant notre attention sur les indications relatives à de l'IIASH, son utilisation courante et les complications qui en découlent. **Résultats :** Seulement 56 % des chirurgiens étaient d'avis que l'IIASH était utile sur le plan thérapeutique, et 72 % des chirurgiens estiment que 60 % ou moins de leurs patients ont tiré un avantage même temporaire de l'IIASH. Le quart des chirurgiens croient que l'IIASH accélère l'évolution de l'arthrite et la plupart d'entre eux ont déclaré que si l'injection n'était plus disponible, ce ne serait pas une grande perte. Dix-neuf pour cent des chirurgiens croyaient que le taux d'infection relié à l'arthroplastie totale de la hanche (ATH) pourrait augmenter après une IIASH, affirmation que l'on a associée à une baisse du nombre des IIASH prescrites par année, comparativement au nombre prescrit par ceux qui n'étaient pas d'avis que les taux d'infection augmenteraient. **Conclusions :** Cette collecte systématique d'opinions d'experts démontre que beaucoup de chirurgiens sont d'avis que chez leurs patients, l'IIASH n'est pas utile sur le plan thérapeutique, mais qu'elle peut accélérer l'évolution de l'arthrite ou augmenter le nombre de complications infectieuses après une ATH subséquente.

From the *Hamilton Arthroplasty Group, Hamilton Health Sciences, Henderson Hospital Site and McMaster University, Hamilton, Ont., and the †Department of Orthopaedics, McFarland Clinic PC, Ames, Iowa.

Study conducted at the Department of Orthopaedics, Hamilton Arthroplasty Group Henderson Site, Hamilton Health Sciences, Hamilton, Ont.

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Correspondence to: Dr. Sarkis (Sam) Kaspar, Department of Orthopaedics, McFarland Clinic PC, 1215 Duff Ave., Ames IA 50010; fax 515 239-4722; mightysamster1@aol.com

Intra-articular steroid hip injection (IASHI) has been used in the management of hip arthritis since the 1950s, at times provoking great controversy, as reviewed elsewhere.¹⁻⁵ However, with advances in the medical and surgical management of painful hip arthritis, the therapeutic role and acceptability of any complications of IASHI are less certain.⁵⁻¹³

Evaluation of the effectiveness of IASHI consists of very limited data^{3-5,7,10} or single expert opinions.^{14,15} However, prescribing patterns and surgeons' experiences with the procedure are difficult to ascertain; billing codes cannot be used for this purpose because the codes for aspiration and injection are similar, leading to uncertainty in data gathered from large billing databases. In addition, the surgeons' experiences and opinions would not be available with a database study based on procedure coding. Indeed, to our knowledge there has never been a concerted study that gathers expert opinion from an entire region, particularly on the perceived effectiveness, prescribing patterns or complications experienced with IASHI. We have surveyed the entire subset of the Ontario membership of the Canadian Orthopaedic Association (COA) who perform hip replacement surgery. The purpose of the present study is to systematically document, via an extensive questionnaire, the current practices and opinions of experienced orthopedic surgeons across Ontario, regarding various aspects of IASHI treatment for painful arthritis of the hip.

Methods

A 2-page questionnaire was developed to survey expert opinion and practice patterns pertaining to the indications, current use and complications of IASHI. The questionnaire was piloted at a tertiary care centre, further refined to the definitive version presented here, and subsequently distributed province-wide.

The offices of all 253 Ontario members of the COA were telephoned, establishing that 136 of actively practising surgeons perform total hip arthroplasty (THA) as part of their practice. The remaining 117 surgeons were excluded from the subject pool because they either do not currently perform THA (i.e., have a different specialty area [$n = 74$]) or because they were retired and had no office, had a COA-listed phone number that was no longer in service, were no longer practising in Canada, requested an honorarium for participation or could not be reached after a minimum of 3 phone call attempts on 3 separate days ($n = 43$). Surgeons were not excluded based on volume of THA performed per year, which was not a requested variable in the questionnaire. Almost all of the 136 questionnaires were distributed by fax, and some by postal mail or email if requested. Once the completed questionnaires (99/136 distributed [73% response rate]) were returned to the investigators, the answers were entered into one master spreadsheet.

The data were all collected before any national presentation of our data on infection rates from IASHI;¹⁶ data collection for the questionnaire took place between December 2002 and July 2003. Surgeons at our centre, where the pilot questionnaire was initially distributed, were excluded from the present analysis. Many of the questions on the final questionnaire were administered as categorical or ordinal scales, because in the pilot study questions concerning continuous variables were often left blank.

Statistical analysis included summary statistics, analysis of variance (ANOVA) with post hoc Scheffé tests, and χ^2 or the Fisher exact test where appropriate. Statistical significance was set at $p < 0.05$.

Results

Of the 99 hip surgeons who com-

pleted the questionnaire, only 11 (11%) had fewer than 5 years' experience, 24 (24%) had 5-10 years' experience and most (64 surgeons [65%]) had more than 10 years' experience (Table 1). The results of most of the remaining questions are pooled by these categories. Nonresponse rates to specific questions are listed if greater than 5% in any column.

Use of IASHI by orthopedic hip surgeons

The reported use of IASHI is summarized in Table 1. Almost two-thirds of the surgeons had more than 10 years' experience, and 73%-100% within each category had at least a moderate volume ($> 20/\text{yr}$) of patients with hip arthritis. Seventy-eight surgeons (82%) used the procedure at least once per year. Subdividing these by the number of years of clinical experience revealed fairly uniform utilization rates, with 13%-19% of surgeons not ordering any IASHI, and about half of the surgeons ordering 1-5 per year, with the remainder ordering more. The mean number of injections ordered per surgeon annually was 5.6 (standard error of the mean [SEM] 1.6; $n = 93$ who replied to that question), with little variability among the 3 experience groups ($p = 0.54$, ANOVA).

Table 1 reveals that although 82% used IASHI, only 56% of surgeons felt that it was a useful tool in their practice. Furthermore, 55% responded that it would not be a great loss if IASHI were no longer available, and only 25% believed the procedure to be underused. The most common reasons cited for underuse were resource availability, technical difficulty of the procedure and concerns regarding infection. Excessively advanced arthritis and the utility of the procedure mainly for diagnostic purposes were also cited.

Overall, only 30% of respondents (in the > 10 years' experience group) felt that it would be a great loss if IASHI were no longer available; with

less experience, there was a progressively higher percentage of respondents who felt the procedure would be a great loss if no longer available (46% in the 5–10 year group, 82% in < 5 year group). These differences were statistically significant ($p = 0.019$ with $3 \times 2 \chi^2$ test, 2-sided), with post hoc 2×2 comparisons being statistically significant only between the least and most experienced groups ($p = 0.003$, Fisher exact test, 1-sided). Among the subgroup of those who felt the procedure to be useful for their patients, 70% felt that it would be a great loss if IASHI were no longer available (Table 1, question 5).

Surgeons' views of indications for and contraindications to IASHI

The most frequently listed indications for prescribing IASHI in this study (Table 2) were for therapeutic purposes (pain relief [66%]) or diagnostics (82%, including 77/81, or 95% of these, being for working up patients with hip–spine comorbidity). Only 7 surgeons (7%) listed no indications at all, and another 7 surgeons (7%) had lists of indications that did *not* include any diagnostic purposes at all.

Regarding the type of arthritis, perhaps surprisingly, 64% of surgeons did not feel that the presence of

rheumatoid arthritis would alter their frequency of ordering IASHI. Opinions were different, however, regarding avascular necrosis, with 46% of surgeons indicating that their injection-prescribing practices would be unaltered and 46% indicating that they would offer it *less* often (as opposed to the 9%–10% who would offer injection less often to patients with rheumatoid arthritis or osteoarthritis).

Most respondents (57%) indicated that they would offer IASHI more often in cases of mild arthritis, with an overall proportion of only 15%–17% indicating that they would offer it especially often in cases of oligotrophic arthritis (few osteo-

Table 1
Orthopedic surgeons' profiles and opinions on the use of intra-articular steroid hip injection (IASHI)

Survey question	Group of surgeons by years of experience; no. (and %) of surgeons			
	< 5 yr n = 11	5–10 yr n = 24	> 10 yr n = 64	Total n = 99
1. Annual volume of patients with hip arthritis				
< 10	1 (9.1)	1 (4.2)	0	2 (2.0)
11–20	2 (18.2)	2 (8.3)	0	4 (4.0)
> 20	8 (72.7)	21 (87.5)	64 (100.0)	93 (93.9)
2. Annual number of IASHIs ordered (open-ended question)				
0	2 (18.2)	3 (12.5)	12 (18.8)	17 (17.2)
1–5	5 (45.5)	10 (41.7)	33 (51.6)	48 (48.5)
6–10	3 (27.3)	4 (16.7)	9 (14.1)	16 (16.2)
> 10	0	6 (25.0)	8 (12.5)	14 (14.1)
*Did not specify	1 (9.1)	1 (4.2)	2 (3.1)	4 (4.0)
3. Do you believe IASHI to be a useful tool in your practice?				
Yes	8 (72.7)	14 (58.3)	34 (53.1)	56 (55.6)
No	3 (27.3)	10 (41.7)	29 (45.3)	42 (42.4)
4. Would it be a great loss if IASHI was no longer available?				
Yes	9 (81.8)	11 (45.8)	19 (29.7)	39 (39.4)
No	2 (18.2)	11 (45.8)	41 (64.1)	54 (54.5)
*Did not answer	0	2 (8.3)	4 (6.3)	6 (6.1)
5. IASHI is useful, and would be no great loss				
	0/8	4/14 (28.6)	13/34 (38.2)	17/56 (30.4)
6. Do you think IASHI is an underused procedure?				
Yes	3 (27.3)	2 (8.3)	20 (31.3)	25 (25.3)
No	6 (54.5)	17 (70.8)	32 (50.0)	55 (55.6)
*Did not answer	2 (18.2)	5 (20.8)	12 (18.8)	19 (19.2)
7. If "yes" (underused), why? (open-ended question)				
Resource availability (fluoroscopy, radiologist)	3/3	1/2	4/20 (20.0)	8/25 (32.0)
Difficult joint to inject (less accessible)	0/3	0/2	4/20 (20.0)	4/25 (16.0)
Risk of infection	0/3	0/2	3/20 (15.0)	3/25 (12.0)
Patient's condition too far advanced when seen	0/3	0/2	2/20 (10.0)	2/25 (8.0)
More of a diagnostic test	0/3	0/2	1/20 (5.0)	1/25 (4.0)
*Did not specify any reasons	0/3	1/2	6/20 (30.0)	7/25 (28.0)

*For each question, if the nonresponse rate was greater than 5%, then the nonresponse rate is listed as a separate row.

phytes) or in cases with cystic changes or advanced joint-space narrowing. No rationales for the latter practices were specified.

Second injections were considered acceptable by 77% of surgeons, if the first injection went well; among these surgeons, 84% suggested waiting times of between 3 and 6 months before the next injection (Table 2, question 4). If the surgeons who do not prescribe IASHI are removed from this tally, the number of prescribers who would give a second

injection is 9 of 9 (< 5 years' experience), 16 of 21 (5–10 years' experience) and 45 of 52 (> 10 years' experience), with the respective percentages being 100%, 76% and 87% with increasing experience.

In total, 58% of surgeons would not be influenced by the patient's age, although 17% and 18% felt that the procedure was especially useful for either very old or very young patients, respectively.

The reasons listed for not prescribing IASHI, which were replies to an

open-ended question (Table 2, question 6), included 41% of surgeons listing infection (either the risk of infection, suspicion of existing infection or previous infection). The remaining reasons were all cited less than 9% of the time (advanced arthritis, allergy, obesity, radiography suite unavailable) or 2% of the time (presence of avascular necrosis, upcoming hip surgery, not useful for young patients). Further replies included one instance each (out of 99 respondents) of the following 8 responses: poor

Table 2

Surgeons' indications for and contraindications to the use of intra-articular steroid hip injection (IASHI)

Survey question	Group of surgeons by years of experience; no. (and %) of surgeons			
	< 5 yr n = 11	5–10 yr n = 24	> 10 yr n = 64	Total n = 99
1. What are your indications for hip injection? (check all that apply)				
Diagnostic, e.g., to sort out hip versus spine issue	10 (90.9)	21 (87.5)	50 (78.1)	81 (81.8)
Therapeutic — relief of pain	9 (81.8)	13 (54.2)	43 (67.2)	65 (65.7)
Patient not ready for surgery	7 (63.6)	8 (33.3)	33 (51.6)	48 (48.5)
Therapeutic — while waiting for arthroplasty	8 (72.7)	8 (33.3)	26 (40.6)	42 (42.4)
Patient can't take arthritis pills	6 (54.5)	5 (20.8)	30 (46.9)	41 (41.4)
No success from other treatments (i.e., physiotherapy, pills)	5 (45.5)	4 (16.7)	21 (32.8)	30 (30.3)
Patient specifically requests procedure	3 (27.3)	5 (20.8)	19 (29.7)	27 (27.3)
Mainly used as an addition to other treatments	4 (36.4)	4 (16.7)	19 (29.7)	27 (27.3)
Mainly used after other treatments failed	3 (27.3)	5 (20.8)	18 (28.1)	26 (26.3)
Consider it as one primary arthritis-treatment option	0	1 (4.2)	1 (1.6)	2 (2.0)
*Did not list any indications				7 (7.1)
2. Would you offer steroid hip injection more often, with the following types of arthritis:				
(a) Rheumatoid hip arthritis				
Inject more often	4 (36.4)	6 (25.0)	10 (15.6)	20 (20.2)
Inject less often	2 (18.2)	0	8 (12.5)	10 (10.1)
This factor would not change my management	4 (36.4)	17 (70.8)	42 (65.6)	63 (63.6)
*Did not answer	1 (9.1)	1 (4.1)	4 (6.2)	6 (6.1)
(b) Osteoarthritis of the hip				
Inject more often	2 (18.2)	0	10 (15.6)	12 (12.1)
Inject less often	1 (9.1)	0	8 (12.5)	9 (9.1)
This factor would not change my management	8 (72.7)	19 (79.2)	42 (65.6)	69 (69.7)
*Did not answer	0	5 (20.8)	4 (6.2)	9 (9.1)
(c) Avascular necrosis				
Inject more often	0	0	2 (3.1)	2 (2.0)
Inject less often	5 (45.5)	6 (25.0)	34 (53.1)	45 (45.5)
This factor would not change my management	5 (45.5)	16 (66.7)	24 (37.5)	45 (45.5)
*Did not answer	1 (9.1)	2 (8.3)	4 (6.2)	7 (7.1)
(d) If you suspect an effusion of the hip joint				
Inject more often	2 (18.2)	1 (4.2)	22 (34.4)	25 (25.3)
Inject less often	0	4 (16.7)	12 (18.8)	16 (16.2)
This factor would not change my management	1 (9.1)	17 (70.8)	25 (39.1)	43 (43.4)
*Did not answer	8 (72.7)	2 (8.3)	5 (7.8)	15 (15.2)

range of motion, early osteoarthritis, diabetes, rarely lasting benefit from IASHI, cysts, pain, failure with previous injection, patient taking anticoagulants. Two surgeons stated that there were no reasons to withhold IASHI. The percentage of nonresponders on that question was 28%.

Surgeons' perceptions of the effectiveness and complications of IASHI

Surgeons reported variable perceptions of the effectiveness of IASHI

(Table 3, questions 1, 2), but 2 clear observations can be made. Half of all surgeons (49/99 [49%]) reported that they felt less than 40% of patients were helped by the procedure. Only 20% of surgeons felt that more than 60% of patients were helped therapeutically by the procedure. Patient-reported duration of pain relief reported to 83% of surgeons typically fell into categories between 0 and 6 months.

Infection rates were considered to be less than 2% by most surgeons, with only 3 surgeons (3%) indicating

that the rate of infection after IASHI was greater than 2%. Patients' loss or gain of function, and time taken away from activities due to the IASHI procedure, cannot be judged by the present study. However, 34 surgeons (34%) recommended some type of gait aid or rest after the injection procedure, with two-thirds advising normal activities or no special directions.

Most respondents (61%) indicated that IASHI does not alter arthritis progression (regardless of symptomatic relief), with 25% perceiving

Table 2 continued

Surgeons' indications for and contraindications to the use of intra-articular steroid hip injection (IASHI)

Survey question	Group of surgeons by years of experience; no. (and %) of surgeons			
	< 5 yr n = 11	5-10 yr n = 24	> 10 yr n = 64	Total n = 99
3. Type of radiographic findings; would you offer IASHI more often when (check all that apply)				
Mild arthritis	9 (81.8)	13 (54.2)	34 (53.1)	56 (56.6)
Cystic changes on radiographs	0	4 (16.7)	13 (20.3)	17 (17.2)
Severe joint-space narrowing	1 (9.1)	4 (16.7)	12 (18.8)	17 (17.2)
Case with few or no osteophytes	3 (27.3)	1 (4.2)	11 (17.2)	15 (15.2)
4. Repeat injection:				
(a) Would you give a second injection if the first one went well and the patient was agreeable?	11 (100)	16 (66.7)	49 (76.6)	76 (76.8)
(b) How long would you advise waiting before a second injection?				
1-2 mo	0/11	0/16	4/49 (8.2)	4/76 (5.3)
3-6 mo	10/11 (90.9)	14/16 (87.5)	40/49 (81.6)	64/76 (84.2)
> 6 mo	1/11 (9.1)	1/16 (6.3)	4/49 (8.2)	6/76 (7.9)
*Did not specify time period	0/11	1/16 (6.3)	1/49 (2.0)	2/76 (2.6)
5. IASHI and age of the patient with hip arthritis:				
Especially useful in a very young patient (< 40 yr)	2 (18.2)	5 (20.8)	11 (17.2)	18 (18.2)
Especially useful in a very old patient (> 85 yr)	0	5 (20.8)	12 (18.8)	17 (17.2)
Age would not strongly influence my decision	9 (81.8)	12 (50.0)	36 (56.3)	57 (57.6)
*Did not answer	0	2 (8.3)	5 (7.8)	7 (7.1)
6. Do you feel there are reasons not to have IASHI? (open-ended question)				
Active infection or infection risk	3 (27.3)	14 (58.3)	24 (37.5)	41 (41.4)
Advanced/severe osteoarthritis	2 (18.2)	2 (8.3)	5 (7.8)	9 (9.1)
Allergy	1 (9.1)	3 (12.5)	3 (4.7)	7 (7.1)
Obesity	1 (9.1)	1 (4.2)	2 (3.1)	4 (4.0)
Radiology unavailable	0	0	3 (4.7)	3 (3.0)
Avascular necrosis	0	0	2 (3.1)	2 (2.0)
Upcoming hip surgery	0	1 (4.2)	1 (1.6)	2 (2.0)
Age (not useful for young person)	0	0	2 (3.1)	2 (2.0)
Surgeons stating no contraindications to IASHI	0	1 (4.2)	1 (1.6)	2 (2.0)
*No contraindications listed				28 (28.3)

*For each question, if the nonresponse rate was greater than 5%, then the nonresponse rate is listed as a separate row.

that IASHI may increase the rate of progression.

Finally, the surgeons were polled regarding the perceived effect of IASHI on the outcome of subsequent THA. Table 3, question 7, deals with this in terms of 3 domains: function, pain relief and infection rates. The vast majority of surgeons indicated that they had noticed no differences in function (91% of respondents), pain relief (88%) or infection rates (70%) for THA after IASHI. The lower uniformity of opinions concerning infection com-

pared with function and pain relief was statistically significant (post hoc pairwise $2 \times 2 \chi^2$ tests, $p < 0.001$), as was the distribution of opinions between choices concerning infection (better, worse, no difference) ($p < 0.001$, $3 \times 2 \chi^2$ overall).

Overall, 19% of surgeons indicated that they believe prior IASHI may cause an increased infection rate in subsequent THA. In Table 4, this concept is elaborated upon. Surgeons who stated that there was not an increased infection rate, as well as indicating that it would be a great

loss if IASHI was no longer available, ordered far more injections per year (mean > 10) than all other groups, whereas the group that ordered the fewest injections were those who felt the infection rate was greater and that it would be no great loss to lose IASHI (mean < 2 injections per year). Statistical significance is detailed in the footnote to Table 4.

Discussion

To our knowledge, this is the first systematic evaluation of expert opin-

Table 3

Surgeons' perceptions of the effectiveness and complications of intra-articular steroid hip injection (IASHI)

Survey question	Group of surgeons by years of experience: no. (and %) of surgeons			
	< 5 yr <i>n</i> = 11	5–10 yr <i>n</i> = 24	> 10 yr <i>n</i> = 64	Total <i>n</i> = 99
1. How many patients get therapeutic benefits from IASHI?				
0–20	0	6 (25.0)	17 (26.6)	23 (23.2)
20–40	5 (45.5)	10 (41.7)	11 (17.2)	26 (26.3)
40–60	3 (27.3)	2 (8.3)	17 (26.6)	22 (22.2)
60–80	3 (27.3)	5 (20.8)	8 (12.5)	16 (16.2)
80–100	0	0	4 (6.3)	4 (4.0)
*Unknown or did not specify	0	1 (4.2)	7 (10.9)	8 (8.1)
2. What is the duration of pain relief typically reported to you?				
< 1 mo	0	6 (25.0)	6 (9.4)	12 (12.1)
1–3 mo	5 (45.5)	10 (41.7)	33 (51.6)	48 (48.5)
3–6 mo	3 (27.3)	4 (16.7)	15 (23.4)	22 (22.2)
6–12 mo	1 (9.1)	2 (8.3)	3 (4.7)	6 (6.1)
1–2 yr	0	0	0	0
> 2 yr	0	0	0	0
*Unknown amount of time or did not specify	2 (18.2)	2 (8.3)	7 (10.9)	11 (11.1)
3. What percentage of infection do you see/estimate from patients? (open-ended question)				
0–1	3 (27.3)	9 (37.5)	24 (37.5)	36 (36.4)
1–2	2 (18.2)	6 (25.0)	11 (17.2)	19 (19.2)
> 2	2 (18.2)	0	1 (1.6)	3 (3.0)
Unknown	1 (9.1)	0	10 (15.6)	11 (11.1)
*No answer given	3 (27.3)	9 (37.5)	18 (28.1)	30 (30.3)
4. What special instructions do you give to patients after IASHI?				
Use a cane	1 (9.1)	3 (12.5)	8 (12.5)	12 (12.1)
Use crutches for 2–3 d	1 (9.1)	0	1 (1.6)	2 (2.0)
Bed rest	0	0	6 (9.4)	6 (6.1)
Decreased activity for 1–3 d	0	7 (29.2)	7 (10.9)	14 (14.1)
Total no. of surgeons who recommended reduced activity				34 (34.3)
Walk around for the day	5 (45.5)	3 (12.5)	6 (9.4)	14 (14.1)
Normal activities	0	1 (4.2)	0	1 (1.0)
No special instructions	0	8 (33.3)	8 (12.5)	16 (16.2)
Total no. of surgeons who recommended normal activity				31 (31.3)
*Did not check off any instructions, did not comment	4 (36.4)	2 (8.3)	28 (43.8)	34 (34.3)

ion in an entire region pertaining to IASHI. These findings are useful for describing the current state of typical practice, utilization and experiences

of hip surgeons in Ontario, as well as to help guide the context and interpretation of future studies. Important findings included the

fact that only 56% of surgeons felt that IASHI was actually useful, with only 30% of experienced surgeons (> 10 years) noting that it would be

Table 3 continued

Surgeons' perceptions of the effectiveness and complications of intra-articular steroid hip injection (IASHI)

Survey question	Group of surgeons by years of experience; no. (and %) of surgeons			
	< 5 yr n = 11	5-10 yr n = 24	> 10 yr n = 64	Total n = 99
5. Do you believe that steroid hip injection has any effects on arthritis progression? Check one				
Does NOT alter (progression maintains same pace)	8 (72.7)	16 (66.7)	36 (56.3)	60 (60.6)
May INCREASE arthritis progression	2 (18.2)	5 (20.8)	18 (28.1)	25 (25.3)
May DECREASE arthritis progression	0	0	1 (1.6)	1 (1.0)
*Did not answer	1 (9.1)	3 (12.5)	9 (14.1)	13 (13.1)
6. No. of IASHIs prescribed per year by surgeons who believe it hastens arthritis progression				
	0, 1 (2 surgeons)	2, 3, 5, 10, 25 (5 surgeons)	0-6 (17 surgeons)	12 (1 surgeon)
7. Do you believe that prior steroid injection has any effect on the ultimate outcome of THA?				
(a) Function				
Better	0	0	0	0
Worse	0	1 (4.2)	1 (1.6)	2 (2.0)
No difference	11 (100.0)	22 (91.7)	57 (89.1)	90 (90.9)
*Did not answer	0	1 (4.2)	6 (9.4)	7 (7.1)
(b) Pain relief				
Better	1 (9.1)	0	1 (1.6)	2 (2.0)
Worse	0	0	0	0
No difference	10 (90.9)	21 (87.5)	56 (87.5)	87 (87.9)
*Did not answer	0	3 (12.5)	7 (10.9)	10 (10.1)
(c) Infection rate				
More	4 (36.4)	3 (12.5)	12 (18.8)	19 (19.2)
Less	0	0	0	0
No change	7 (63.6)	17 (70.8)	45 (70.3)	69 (69.7)
*Did not answer	0	4 (16.7)	7 (10.9)	11 (11.1)

Note: THA = total hip arthroplasty.

*For each question, if the nonresponse rate was greater than 5%, then the nonresponse rate is listed as a separate row.

Table 4

Comparison of volume of IASHIs ordered, as a function of opinions regarding infection in subsequent THA*

Believes THA infection increases after IASHI (from Table 3, question 7c)	Great loss if IASHI no longer available (from Table 1, question 4)	Injections ordered per year (from Table 1, question 2), mean, (SEM) and (no. of surgeons)
NO, infection not increased	YES, would be a great loss	10.56 (1.18) (27) ^a
	NO, no great loss	3.83 (1.04) (35) ^b
YES, infection may increase	YES, would be a great loss	5.50 (3.07) (4)
	NO, no great loss	1.96 (1.64) (14) ^b
		Total = 5.46 (0.95) (80)

Note: IASHI = intra-articular steroid hip injection; SEM = standard error of the mean; THA = total hip arthroplasty.

*Number of IASHI procedures ordered per year, pooled by opinions expressed on other questions in this survey. Surgeons were included in this comparison only if they had provided complete data on all questions pertinent to this table. Overall comparison was by analysis of variance (ANOVA) ($p < 0.001$ comparing all 4 groups, with observed power = 0.9), followed by post hoc pairwise Scheffé testing. The group marked ^a differed statistically from the 2 groups marked ^b (both were $p < 0.001$), but not from the fourth group ($p = 0.50$, not marked with ^b). The 2 groups marked with ^b did not differ from each other ($p = 0.82$).

a great loss if it were no longer available. Four in 5 surgeons cited the usefulness of hip injection for differentiating hip–spine comorbidity, and 66% used IASHI at times for therapeutic purposes. Infection rates were considered to be less than 2% by most surgeons, but one-quarter of the surgeons felt that IASHI accelerates arthritis progression, most of whom had stated that it would be no great loss if IASHI was no longer available. Nineteen percent of the surgeons believed that there may be an increased infection rate of THA after IASHI, and this opinion was associated with reduced use of IASHI.

Limitations of this study include the inherently flawed nature of surveyed opinions, as opposed to research-based outcome studies. However, utilization and experience can be under-represented in structured studies, to which the present study is adjunctive. The high response rate of 73% on a lengthy questionnaire, with a broad range of opinions expressed, suggests that bias and undersampling were limited. We did not undertake an examination of all factors leading to the expressed opinions, such as preferences of mentors or training centre, or procedure reimbursements, but we have examined the experience-based preferences, indications and perceived problems with IASHI, as well as offering open-ended questions for elaboration.

Other limitations included the lack of data on the number of THA performed and regarding what percentage of patients might have had IASHI. The surgical volume was one of the least-answered questions in the pilot survey, and we opted for only a question about volume of patients with arthritis, because it was relevant to the nonoperative intervention of IASHI. We did not request information about other non-THA hip surgeries such as resurfacing or osteotomies. Similarly, complex questions on arthritis severity were not as reliably answered as the simplified radiographic features queried in

Table 2, and formal staging classifications may not be reliable when taken collectively from memories of professional experience alone. Other outcome measures to determine “success” would be more suitable for a prospective study, but the patient-reported relief of pain was the essential outcome requested in the questionnaire. Injection technique (surgeon v. radiologist, office v. hospital, fluoroscopy v. anatomical landmarks, contrast arthrography v. none, etc.) was not queried and was presumed to be performed with standard modern methods of arthrography and sterile technique, but we recognize that these assumptions may be imperfect. The present study cannot discern whether IASHI carried out by an expert using radiographic control would have superior results; we suggest that a multicentre retrospective cohort analysis may be suitable for answering that question in the future. Covariates such as analgesic use cannot be discerned well retrospectively or in surveys, but would be presumed to be common under usual practice. Finally, there may be patient selection bias, which was the subject of Table 2; interestingly, there appeared to be very few strong trends in patient selection based on type or severity of arthritis or the patient’s age.

Rheumatoid arthritis or effusion prompted more frequent prescriptions of IASHI by only 20% and 25% of surgeons, respectively, which is somewhat surprising given the presumptive anti-inflammatory mechanism of IASHI. Patients with rheumatoid arthritis may also present with low-grade septic arthritis, which would be a contraindication to steroid injection, assuming the condition was recognized. Although little is known about IASHI and avascular necrosis, the evidence of harm with systemic steroids may be one reason for 46% of surgeons to avoid IASHI for patients with this condition.

This survey provides only one aspect of the evaluation of IASHI, and we have forthcoming studies that ob-

jectively review the patient-reported effectiveness of IASHI for pain relief and infection rates of THA after IASHI.¹⁶ The literature,^{2,7,10,17} despite controversies, has generally demonstrated mild and brief pain relief from IASHI, with some patients getting worse. Combining an evaluation of the effectiveness of IASHI versus specialist opinions at each site was not feasible in this study. However, understanding whether experienced practitioners even believe in the procedure is an initial step in guiding our understanding of the procedure’s role in modern orthopedic practice. This study provides systematic documentation of the ongoing division among current expert opinion on the role of IASHI.

Furthermore, this comprehensive set of expert opinions from an entire province, besides complementing studies on effectiveness and complications, provides a context for an individual practitioner to compare their own practice patterns with those of the respondents in this study. The procedure is commonly ordered by orthopedic surgeons, rheumatologists, physiatrists and general practitioners. This should be useful as a starting point for future guideline development, for patients giving informed consent for the procedure and for individual clinical decision-making.

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