Clinical Reports

Ankylosing spondylitis and neuraxial anaesthesia – a 10 year review

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Purpose: *Ankylosing Spondylitis (AS) patients present specific challenges to the anaesthetist. Both airway management and neuraxial access may prove to be difficult. The trend has been to deal with the airway challenge, and avoid neuraxial anaesthesia. In many cases this may lead to unnecessarily denying the patient neuraxial anaesthesia (NA). We retrospectively reviewed the operative anaesthetic management of 51 consecutive AS patients who underwent 82 perineal or lower limb procedures and concurrent anaesthetic management at the Vancouver Hospital and Health Sciences Center from 1984 through 1994 (inclusive).*

Source: *Anaesthetic records were used to document the type of anaesthetic used, i.e., general or regional, and the degree of difficulty experienced with each.*

Principal findings: *Of the 82 procedures performed on AS patients 16 (19.5%) were planned as NA. General anaesthesia (GA) was planned for 65 (79.3%) of the procedures. One procedure involved monitored anaesthetic care (MAC). Neuraxial access consisted of 13 spinal and three epidural attempts. Spinal anaesthesia was possible in 10 (76.2%) of cases and failed in 3 (23.8%). Epidural anaesthesia was unsuccessful in each attempt. There was no difference in demographics or duration of disease between the successes and failures.*

Conclusions: *These data suggest that spinal anaesthesia can be used as an alternative to general anaesthesia in AS patients undergoing perineal or lower limb surgery. There were no factors identified in this review that were predictive of success or failure in gaining neuraxial access.*

Objectif: *La spondylite ankylosante (SA) représente un défi particulier pour l'anesthésiste. La gestion des voies aériennes et l'accès au neuraxe peuvent être tous deux très difficiles. La tendance a été de relever le défi des voies aériennes et d'éviter l'anesthésie médullaire. Au Vancouver and Health Sciences Center, nous avons relevé rétrospectivement, de 1984 à 1994 inclusivement, la gestion opératoire de 51 patients consécutifs souffrant de SA, opérés à 82 reprises sur le périnée ou sur les membres inférieurs et la gestion anesthésique concomitante.*

Source: *Les dossiers anesthésiques ont servi à documenter le type d'anesthésie, c.-à-d., générale ou régionale, et le degré de difficultés rencontré avec l'une et l'autre.*

Constatations principales: *Des 82 interventions réalisées chez les patients SA, 16 (19,5%) étaient programmés pour une anesthésie régionale centrale. Une anesthésie générale avait été programmée pour 65 (79,3%) des interventions. Les anesthésies régionales programmées comprenaient 13 rachianesthésies et trois épidurales. La rachianesthésie a été possible chez 10 patients (76,2%) et a échoué chez trois (23,8%). Tous les essais d'anesthésie épidurale ont échoué. Ni les différences démographiques ni la durée de la maladie n'ont eu d'influence sur les succès ou les échecs.*

Conclusion: *Ces données suggèrent que la rachianesthésie peut être utilisée à la place de l'anesthésie générale chez les patients souffrant de SA programmés pour une intervention sur le périnée ou les membres inférieurs. Dans ce relevé, on n'a pas identifié de facteurs prédictifs de succès ou d'échec en vue d'une anesthésie régionale centrale.*

Key words

ANAESTHETIC TECHNIQUES: epidural, spinal;
COMPLICATIONS: ankylosing spondylitis.

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Ankylosing spondylitis (AS) is a chronic and usually progressive inflammatory disease involving the articulations of the spine and adjacent soft tissues. The disease predominantly affects young men, beginning most often in the third decade.

The traditional anaesthetic approach to AS patients is to secure the airway using awake endotracheal intubation. The usual reason cited is that fusion of the vertebral column renders neuraxial anaesthesia (NA) difficult or impossible.[1-3] At present, there is very little information on the role of NA in AS patients. Therefore, we

reviewed the approach to AS patients having surgical procedures at one institution over a ten year period. The aim of this study was to investigate the utilization of neuraxial anaesthesia in this population in order to determine whether the success rate was acceptable enough to make this a viable alternative to general anaesthesia.

Methods

After institutional approval we performed a retrospective review of AS patients having surgical procedures between January 1984 and December 1994 at the Vancouver Hospital and Health Sciences Centre. Patient information was obtained using the Prism Abstracting System (Prism Hospital Software, Coquitlam, B.C., Canada). Procedures were coded using the ICD-9-CM method.[4] The diagnosis of AS was confirmed from the admission history and physical examination on the chart. All perineal and lower limb procedures were included. Procedures above the waist were excluded because NA was not an option as the sole anaesthetic. Information gathered from each chart included age, sex, weight, duration of disease and type of anaesthetic used. The type of anaesthetic was broken down into GA, spinal, epidural, or monitored anaesthetic care. If a GA was used the airway managment was recorded as awake fibreoptic intubation, awake direct laryngoscopy, intubation under GA, or face mask ventilation. If NA was used the needle size, intervertebral space, needle position, number of attempts and success was recorded. Each new skin puncture was considered a new attempt. If a patient had more than one procedure done in the study period, each procedure was included in the base population. The data are summarized using descriptive statistics.

Results

Using the methods described above, we identified 51 AS patients who had 82 perineal or lower limb surgical procedures during the ten year study period. Each of 29 patients had one procedure, 15 patients had two, five patients had three, and two patients had four. The patients ranged in age from 17–73 yr with a mean age at time of procedure of 44.2 ± 15.5 yr. The average duration of disease at time of procedure was 19.7 ± 9.4 yr with a range of 4–40 yr. The average age and duration of disease were less for patients receiving GA than NA for the procedure but this difference was not statistically significant. Men underwent 74 (90.2%) procedures and women 8 (9.8%). Of the 82 procedures, 65 (79.3%) were planned as GA, 13 (15.8%) as spinal, 3 (3.6%) as epidural, and 1 (1.2%) as MAC (Table I).

Of the 16 neuraxial blocks attempted 10 (62.5%) succeded and 6 (37.5%) failed. Of the 16 blocks attempted, 13 were spinals and three were epidurals. Spinal anaesthesia was more successful with 10 (76.2%) possible and 3 (23.8%) impossible. Epidural anaesthesia was not possible in three attempts. The average duration of disease at time of procedure was comparable between the successful and unsuccessful spinals (Table II). Needle size ranged from 22–27 ga for the spinals and all epidurals used a 17 ga. The needle position used for spinals was midline in 6 (46.2%) and paramedian in 7 (53.8%) of the attempts. All attempts using midline approach were successful while four of seven using a paramedian approach were successful. Two of the epidural attempts were paramedian and one was midline. The level of the spinal attempt was L_{2-3} or L_{3-4} in 11 cases while the other two were L_{4-5} and L_5-S_1. The levels of the epidural attempts were T_{9-10}, L_{2-3} and L_{3-4}. These levels represent the last level attempted. Details on levels when multiple attempts were made were lacking in the charts reviewed. Each of the spinal anaesthetics is presented in Table III, the epidurals in Table IV.

TABLE I Patient demographic data

	n	Age (yr)	Wt (kg)	F/M	Duration of disease (yr)
GA	65	42.2 ± 15.2	66 ± 14	6/59	17.98 ± 8.8
Spinal	13	52.54 ± 16.1	73.23 ± 13	2/11	25.85 ± 10.4
Epidural	3	47.66 ± 9.07	67.66 ± 4.7	0/3	23.66 ± 3.79
MAC	1	46	60	0/1	29

TABLE II Spinal success vs failure

	n	Age (yr)	Wt (kg)	Duration of disease (yr)
Success	10	53.2 ± 16	76.8 ± 13	25.7 ± 10.58
Failure	3	50.3 ± 19.7	61.3 ± 5.5	26.3 ± 11.93

The use of spinal anaesthesia in these patients was not associated with any adverse events, including hypotension, high block or respiratory compromise. Postoperative data concerning patient satisfaction was difficult to obtain.

Tracheal intubation in the GA cases was attempted conventionally after induction of anaesthesia in 35 (53.8%) of the cases, using awake fibreoptic bronchoscopy in 26 (40%) of the cases, and with awake direct laryngoscopy in 1 (1.5%) of the cases. All of the awake techniques were successful. In two cases when intubation was attempted after GA induction, intubation was not possible. These patients were mask ventilated until they were awake and then dealt with by fibreoptic intubation. Facemask anaesthesia was used in three (4.6%) of the cases (Table V).

TABLE III Spinal anaesthetics

Patient	Age (yr)	Success (n = no) (y = yes)	Wgt (kg)	Duration of AS (yr)	Level	Approach	# Attempts	Needle Size
1a	69	y	90	39	L_{3-4}	Paramed	1	22
1b	69	y	90	40	L_{2-3}	Midline	1	22
1c	69	y	90	40	L_{3-4}	Midline	1	22
2	36	y	65	20	L_{3-4}	Paramed	2	22
3	38	n	64	21	L_{2-3}	Paramed	6	22
4	73	n	55	40	L_5-S_1	Paramed	2	22
5a	43	y	60	20	L_{2-3}	Midline	1	25
5b	43	y	60	20	L_{2-3}	Midline	1	25
6	40	n	65	18	L_{2-3}	Paramed	3	22
7	73	y	87	12	L_{2-3}	Paramed	1	22
8	59	y	86	30	L_{4-5}	Paramed	1	22
9a	35	y	72	18	L_{2-3}	Midline	1	25
9b	36	y	68	18	L_{3-4}	Midline	1	27

TABLE IV Epidural anaesthetics

Patient	Age (yr)	Success (n = no) (y = yes)	Wgt (kg)	Duration of AS (yr)	Level	Approach	# Attempts	Needle Size
1	38	n	64	21	L_{2-3}	Paramed	3	17
2	56	n	66	22	T_{9-10}	Paramed	2	17
3	49	n	73	28	L_{3-4}	Midline	1	17

TABLE V General Anaesthetics

Airway management	n	Success (%)
Intubation after GA induction	35	94.3
Awake fibreoptic bronchoscopic intubation	26	100
Intubation by awake direct laryngoscopy	1	100
Facemask	3	100

Discussion

We investigated the use of neuraxial anaesthesia (NA) in patients with Ankylosing Spondylitis (AS). We were interested in determining the utilization rate and success rate of NA in AS. Since the prevalence rate of AS is very low (0.25–1%),[5] a retrospective review is an acceptable method for studying the role of NA. In addition, the Vancouver Hospital and Health Sciences Centre database provided us with an adequate sample size because it serves as a major tertiary referral centre for the province of British Columbia (population 3.7 m.).[6]

Ankylosing spondylitis is a chronic inflammatory joint disease involving both axial and peripheral joints. Spinal disease begins in the sacroiliac joints and moves cranially. Sacroiliac joints show subchondral granulation tissue invasion and replacement of the fibrinocartilage with fibrous tissue and ossification. In the spine, acute and chronic spondylitis occurs with destruction and rebuilding of bone leading to fibrosis and ossification of the intervertebral disks. This apophysitis combined with the synovitis of the costovertebral and facet joints leads to progressive decrease in spinal mobility. Massive ossification of the ligamentum flavum is extremely uncommon.[8] Peripheral joint involvement is characterized by synovial hyperplasia leading to bony erosion and cartilage destruction followed later by fibrosis and bony ankylosis.[7] The degree of spinal disease ranges from solely sacroiliac involvement to complete ankylosis of the spine. The degree of restriction of spinal flexion measured clinically correlates with the number of changes noted on computer-assisted tomography exam of apophyseal joints.[8] Hip involvement occurs in approximately 30% of patients and can cause significant morbidity.

Airway management in AS patients has been said to present the most serious array of intubation and airway hazards imaginable.[1] This is secondary to the decrease in cervical spine mobility and possible temperomandibular joint disease. Because of this the literature

supports definitive airway management, and many authors consider regional anaesthesia to be contraindicated.[1-3] The reasons cited include inability to gain neuraxial access and the chance that urgent airway control may be needed in the case of a complication of regional anaesthesia.

Ankylosing spondylitis patients may present for a variety of surgical procedures. Some are related to their diseases, others are not. The most common presentations include hip disease requiring replacement, spinal fracture requiring stabilization and correction of spinal deformity by osteotomy (lumbar, thoracic or cervical).[9] Several surgical authors, in reporting their experience with corrective osteotomy, prefer to avoid general anaesthesia.[9,10] They prefer the safety of awake neurological monitoring and wish to avoid the hazards of intubation. A technique using infiltration of local anaesthetic augmented by intravenous diazepam and/or fentanyl is described.

Our purpose was to determine the use of NA in AS patients. Our results indicate that spinal anaesthesia may be relatively underutilized in AS patients presenting for surgery. Spinal anaesthesia was successful in 76.2% of cases for which it was planned. The poor success rate of epidural anaesthesia may be due to the larger needle size or simply to the fewer cases.

Recently, Kumar and Mehta[11] reported three cases in which AS patients were given spinal anaesthesia using a paramedian approach. They found this to be a successful and safe method for lower limb surgery. Although the presence of ossification in the interspinous ligament would suggest better success with a paramedian approach, our results suggest that both midline and paramedian methods may be attempted with success. Although the technical skills of anaesthetists may also determine success rates with NA, all blocks were performed by consultant anaesthetists experienced in spinal and epidural anaesthesia.

This retrospective study has some shortcomings. We cannot conclude that the success rate of spinals observed in the spinal group would be the same if used in the GA group instead of a GA. The attending anaesthetist upon examining the patient may have felt neuraxial anaesthesia was less viable as an option in these patients. We hoped to find predictors of success to better identify AS patients that could benefit from spinal anaesthesia. The age and duration of disease were no different between our successful spinals and our failures. Lumbar spine *x*-rays were not available in the majority of cases to allow a relationship between success rate and severity of disease on *x*-ray to be studied. Unfortunately post-operative information on these patients is essentially unavailable.

In conclusion we have retrospectively reviewed 82 surgical procedures on AS patients over a 10 year period and found that neuraxial anaesthesia can be used in AS patients for perineal and lower limb surgery safely. Spinal anaesthesia was successful in 76.2% of cases for which it was planned. Both the midline and paramedian approaches to spinal anaesthesia may be successful in these patients. Epidural anaesthesia may also be successful but was not found to be so in this review.

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