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Research Article

PREVALENCE OF NASAL CONGESTION/STUFFINESS AFTER SPINAL ANAESTHESIA: THE NIGERIAN EXPERIENCE

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Abstract

Background: Nasal congestion is a complication of neuroaxial block that have been reported in a few case reports but sparsely discussed in literatures. Post spinal anaesthesia, there is an attenuation of the sympathetic tone which can result in nasal congestion and stuffiness. Anaesthetists not aware of this complication may become anxious and may panic. **Objectives:** This study aims to establish the occurrence of nasal congestion/stuffiness after spinal anaesthesia, determine the incidence of nasal congestion/stuffiness after spinal anaesthesia and also determine if nasal congestion is related to post spinal hypotension. **Methodology:** One hundred and eighty patients with a mean age of 38years classified as American Society of Anaesthesiologists physical status 1-11 scheduled for subarachnoid blocks were recruited. After establishing spinal anaesthesia, patients were assessed for nasal stuffiness over 30minutes. **Results:** There were 63 males and 117 females. The prevalence of nasal stuffiness was about 15.0%. 47 of the 117 females recruited had caesarean section, 12 (25.5%) of whom experienced nasal stuffiness. A total of 34 patients experienced hypotension, 19 (55%) of them experienced nasal stuffiness. Nasal stuffiness appears to occur more in pregnant women and is closely related to hypotension in this population. Hypotension appeared to occur randomly in the remaining 15 patients that experienced nasal stuffiness. **Conclusion:** This study established the occurrence of nasal congestion/stuffiness post spinal anaesthesia. The incidence of which appears to be associated with hypotension especially in parturients. Patient should be monitored hemodynamically as nasal stuffiness could indicate a cephalad spread of the local anaesthetic agent or a pronounced effect on the autonomic nervous system.

Keywords: Nasal stuffiness/congestion, Spinal anaesthesia, Sympathetic blockade, Venous congestion.

INTRODUCTION

The use of subarachnoid block has been established as a reliable and safe method of regional anaesthesia for lower abdominal and lower limb surgeries (Kolawole *et al.,* 2022). Although subarachnoid block is popular for its cost effectiveness, ease of establishment, profound analgesia and safety profile, the procedure is still associated with several complications. Some of this complications ranging from mild to severe are well documented. These include generalized body weakness, headache, nausea, vomiting, hypotension, seizures and others not seen in many literatures such as ptosis, miosis, enophthalmos and nasal congestion (Sankar *et al.,* 2020; Jadon, 2014). The nasal mucosa is drained by two venous systems (the resistance and the capacitance) which are anatomically and functionally separate. They are both under the control of the autonomic nervous system. The nasal mucosa receives tonus discharge from the sympathetic nervous system by causing vasoconstriction and emptying of the venous sinusoids via control of arteriovenous anastomoses. This is the most important determinant of nasal patency (Jadon, 2014; Yao *et al.,* 2018). The sympathetic nerve stimulation causes constriction of the capacitance vessels via the effect of noradrenaline on alpha adrenergic receptor mechanism in the venous sinusoids while the parasympathetic nerve stimulation causes non cholinergic dilatation of both resistance and capacitance vessels in the nose. After spinal anaesthesia, there is vasodilatation of the nasal vessels leading to the engorgement of these vessels with a subsequent reduction in the physical size of the nasal passages and a resultant congestion and stuffiness (Jadon, 2014; Corboz *et al.,* 2015). Nasal stuffiness, apart from causing discomfort and anxiety in the patient, has been said to be associated with hypotension of spinal anaesthesia and may be an indication of a cephalad spread of the local anaesthetic agent (Corboz *et al.,* 2015; Bromage, 1975). This study aims to determine the prevalence of nasal congestion and stuffiness post spinal block.

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PATIENTS AND METHODS

The study was a cross sectional study. Following approval from the Lagos State University Teaching Hospital Health Research Ethics Committee, (LREC/6/10/1607), a total of one hundred and eighty patients aged 18-45 years with a mean±SD age of 38.39±8.7 years classified as American Society of Anaesthesiologists physical status 1-11 scheduled for subarachnoid blocks (whether elective or emergency) were recruited. Exclusion criteria included patients with features of upper respiratory tract infection**,** patients with history of recurrent nasal congestion/stuffiness and patients who have failed to give consent to be a part of the study or patients that have problem communicating.

Study protocol

An independent anaesthetist established the spinal anaesthesia with heavy bupivacaine 10-20mg. After establishing spinal anaesthesia, patients were assessed for nasal stuffiness over 30minutes. Their blood pressures were also measured every 5 minutes for 30 minutes after spinal anaesthesia was established. Incident of hypotension which is described as a decrease to 80% of the base line blood pressure were recorded. All information observed was recorded in the study proforma. All patients' data were kept confidential and stored in a personal computer. The study was done at no extra cost or risk to the patients. Each patient opted to be part of the study after the understanding that their decline or withdrawal from the study was without any loss of benefit or extra cost. The study lasted for a period of about nine months each patient was involved for about 40minutes. Information was collected on a pre-designed study proforma. This included socio demographic information, type of surgery, presence or absence of nasal stuffiness/congestion, blood pressure changes and others.

Data analysis

Data was inputted and analyzed using the Statistical Package for Social Sciences (SPSS) version 25. Numeric variables were presented using mean and standard deviation or median and interquartile range when skewed. Frequency and percentages were presented for categorical variables. Association between categorical variables was carried out using Chi-square and Fischer exact test. The significance level was set at p≤ 0.05 for all statistical tests. Charts were used for data presentation where necessary. Patients with features of upper respiratory tract infection, history of recurrent nasal congestion/stuffiness, patients having difficulty in communication, and those who have failed to give consent to be a part of the study were excluded from the study.

RESULTS

A total of one hundred and eighty patients were studied. Table 1 showed the age and sex distribution of the participants. The mean±SD age was 38.39±8.7 years. There were 63 males and 117 females. Figure 1 displayed the prevalence of nasal stuffiness which was about 15.0% (27 patients). 47 of the 117 females recruited had caesarean section, 12 (25.5%) of whom experienced nasal stuffiness. Table 11 compares the association between nasal congestion and some commonly occurring spinal complication. A total of 34 patients experienced hypotension, 19 (55%) of them experienced nasal stuffiness. Out of the 27 patients who experienced nasal stuffiness in our study, twelve of them had caesarean section. 8 (66%) of the 12 patients that had caesarean section experienced both significant hypotension and nasal stuffiness. Nasal stuffiness appears to occur more in pregnant women and is closely related to hypotension in this population.

Hypotension appeared to occur randomly in the remaining 15 patients that experienced nasal stuffiness. Other immediate complications of spinal such as vomiting and shivering occurred in all the patients in no specific pattern. After completion of data collection, they were checked for error (if any). The data were entered to SPSS version 25.0 statistical package and analysis was performed. Numerical variables were analysed using independent student's t-test. Incidence of hypotension was compared using chi-square test. The p-value <0.05 was considered statistically significant. Numerical data were presented as mean±Standard deviation or median (IQR) and categorical data as proportions (%). Baseline characteristics and risk levels were checked for similarity in the groups. The flow chart of the study is depicted in Fig II.

Table 1. Age and gender distribution of participants

Variable	Frequecy	Percentage
Age group (Years)		
≤30	35	19.4
31-40	71	39.4
41-50	57	31.7
>50	17	9.4
Mean±SD	38.39±8.7	
Gender		
Male	63	35.0
Female	117	65.0

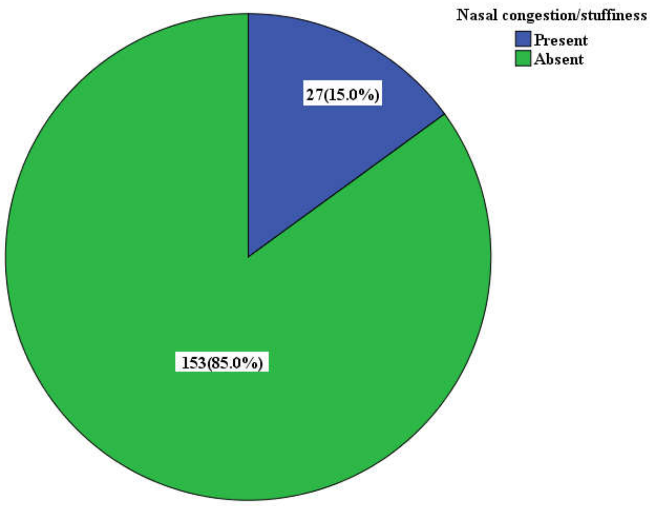

Fig. 1. Incidence Of Nasal Congestion

Table 11. Association between Nasal congestion/stuffiness and other complications

	Nasal congestion	Non-nasal congestion	Total	X^2	p-value
Hypotension					
Present	19(55.9)	15(44.1)	34(100.0)	54.949	<0.001*
Absent	8(5.5)	138(94.5)	146(100.0)		
Tachycardia					
Present	8(72.7)	3(27.3)	11(100.0)	30.622	<0.001*
Absent	19(11.2)	150(88.8)	169(100.0)		
Vomiting					
Present	5(23.8)	16(76.2)	21(100.0)	1.447	0.229
Absent	22(13.8)	137(86.2)	159(100.0)		
Shivering					
Present	8(33.3)	16(66.7)	24(100.0)	7.300	0.007*
Absent	19(12.2)	137(87.8)	156(100.0)		
Type of surgery					
CS	12(25.5)	35(74.5)	47(100.0)	5.534	0.019*
Others	15(11.3)	118(88.7)	133(100.0)		

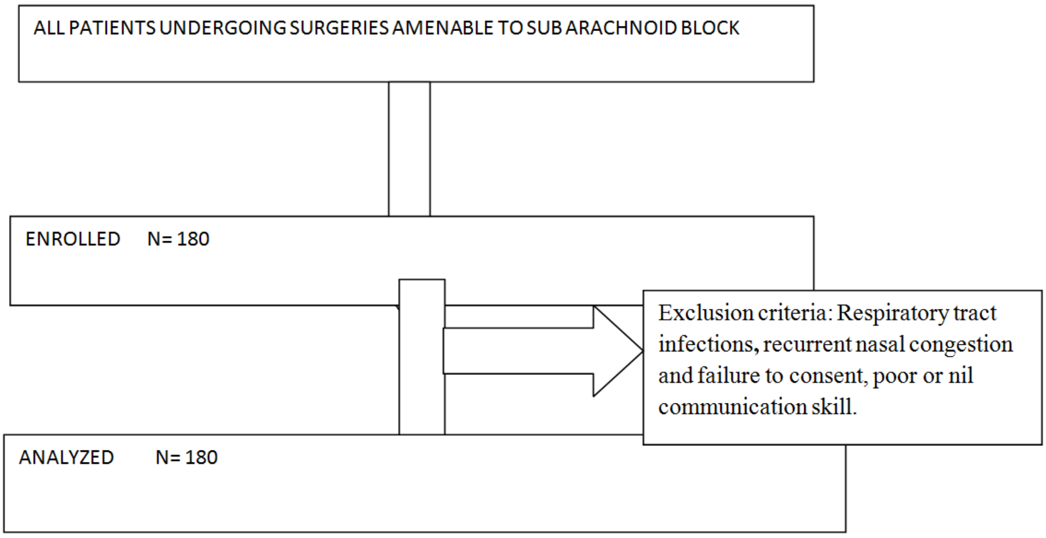

Fig. 2. Flow chart of the study

DISCUSSION

This study established the occurrence of nasal stuffiness/congestion in some patients after spinal anaesthesia. 27 patients (15%) of the 180 patients recruited for the study experienced nasal congestion following spinal anaesthesia for surgeries amenable to the technique. Some literatures have made references to the occurrence of this symptom after spinal anaesthesia (Sankar *et al.,* 2020) but there are limited literatures acknowledging the occurrence of nasal congestion and stuffiness post spinal anaesthesia and no literature discussing the incidence or prevalence of this symptom post subarachnoid block either locally or internationally. The nasal mucosa is drained by two venous systems (the resistance and the capacitance) which are anatomically and functionally separate. They are both under the control of the autonomic nervous system. The nasal mucosa receives tonus discharge from the sympathetic nervous system by causing vasoconstriction and emptying of the venous sinusoids via control of arteriovenous anastomoses. This is the most important determinant of nasal patency (Jadon, 2014; Yao *et al.,* 2018). The sympathetic nerve stimulation causes constriction of the capacitance vessels via the effect of noradrenaline on alpha adrenergic receptor mechanism in the venous sinusoids while the parasympathetic nerve stimulation causes non cholinergic dilatation of both resistance and capacitance vessels in the nose. Post spinal anaesthesia, there is associated vasodilatation of the nasal vessels leading to a venous engorgement of these vessels with a subsequent reduction in the physical size of the nasal passages and a resultant congestion and stuffiness (Jadon, 2014; Corboz *et al.,* 2015). The present study also established that nasal stuffiness can occur in both sexes as evidenced in table I of the results where 35% were male as against 65% female. With gravid female appearing to have a higher occurrence compared to others. Of the 27 patients who experienced nasal stuffiness, 12 (44.4%) of them had caesarean section. 8 (66%) of this 12 patients experienced both significant hypotension and nasal stuffiness. This indicates that there may be some correlation between nasal stuffiness and hypotension. It may suggest that nasal stuffiness sometimes indicate a worsening of symptoms of sympathetic blockade or cephalad spread of local anaesthetic agent as suggested by Bromage *et al.* (1975), Greene and colleagues (Greene, 1958) and Heavener *et al.* (1974). This is further supported by the index study wherein 19 (55%) of the 34 patients who experienced hypotension after spinal anaesthesia also experienced nasal stuffiness. Several literatures have attempted to explain the occurrence of features of sympathetic blockade in the upper extremities and head region even when the level of block does not appear to be above the lower thoracic level (Bromage, 1975; Greene, 1958; Heavener *et al.,* 1974) Local anaesthetic agents injected in the lumbar region, is unlikely to rise to the higher thoracic levels except in pregnant women when the spread can be exaggerated due to their contracted spinal spaces from the effect of the uterine compression on the vessels (Bromage, 1975). This may explain why most of the case reports on nasal stuffiness had been observed in gravid patients (Sankar *et al.,* 2020; Jadon, 2014). The height of a neuroaxial block assessed by response to pin prick or some other painful stimulus may be misleading with regards the level of block as the sensory loss of temperature transmitted by A delta and C nerve fibres is an average of 2 spinal segments and occasionally up to six spinal segments higher than the sensory loss to pin prick which is also transmitted by A delta and C fibres. The fibres transmitting temperature thus appear to be more sensitive to the effect of local anesthetic agents than those subserving pain. The implication is that there could be a wrongly assessed lower level of block achieved by the neuroaxial block (Greene, 1958; Heavener *et al.,* 1974). Similarly, it has also been suggested that B fibres which are preganglionic sympathetic fibres are found in the dura and epidural spaces and are more sensitive to local anaesthetic agents than the unmyelinated C fibers (Greene, 1958; Heavener *et al.,* 1974). All the above, may explain the appearance of features of sympathetic block in the head region when the sensory level is low or mid thoracic. From the result observed in this study, nasal stuffiness/congestion appears to be a benign, transient and self limiting symptom post spinal anaesthesia considering the mean onset time in the patients compared with the time it takes the symptom to fully resolve spontaneously (less than 30minutes) in all the study subjects without any specific intervention. However, the unexpected occurrence of this symptom in a patient may trigger significant anxiety in both the patient and that anaesthetist not aware of the occurrence of nasal stuffiness after spinal anaesthesia. Furthermore, nasal stuffiness may be an indication of an exaggerated response to the sympathetic blockade or a pronounced effect of the parasympathetic system after a subarachnoid block. It could also be an undetected cephalad spread of the local anaesthetic agent (Corboz *et al.,* 2005; Bromage, 1975)

Limitations: Paucity of previous literatures on the research topic

Conclusion

This study established the occurrence of nasal stuffiness/congestion with a prevalence of about 15%.The presence of nasal stuffiness after spinal anaesthesia appears to be benign, transient and self limiting but patient should be monitored haemodynamically till symptom resolves as the presence of nasal stuffiness could herald a pronounced effect on the autonomic nervous system or a cephalad spread of the local anaesthetic agent.

Conflict of interest: The authors declare no competing interest in this study.

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