

The Impact of Nuchal Cord on Fetal Outcome, Mode of Delivery, and Its Management: A Questionnaire Survey of All Hong Kong Obstetricians and Gynaecologists

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Objectives: To explore the view of Hong Kong obstetrics and gynaecology specialists on the impact of nuchal cord on fetal outcome, mode of delivery, and its management.

Methods: A questionnaire was mailed to all registered Hong Kong specialists in obstetrics and gynaecology (n=381) in July 2012 with a prepaid return envelope.

Results: The overall response rate was 50.7%. About one-third and one-fifth of specialists considered that nuchal cord could cause intrauterine death and intrapartum fetal death / neonatal death, respectively. In addition, approximately half believed that it reduced the possibility of a successful normal vaginal delivery, and increased the rate of assisted vaginal delivery. Nonetheless only 4.7% would advise patients to elect for Caesarean section in the presence of nuchal cord. There were no significant differences in the opinions of the impact of nuchal cord on fetal outcome and mode of delivery between specialists working in the Hospital Authority / public institutions versus those in private practice, between Maternal-Fetal Medicine (MFM) subspecialists versus non-MFM specialists, as well as between specialists with different years of practice after obtaining Fellowship of the Hong Kong Academy of Medicine. Around one-third in private practice routinely screened for nuchal cord on ultrasound, compared with none who practised in Hospital Authority / public institutions.

Conclusion: A significant proportion of obstetrics and gynaecology specialists thought that nuchal cord would lead to adverse fetal outcome and affect the mode of delivery. A large local study of nuchal cord should be conducted in order to guide clinical management and provide evidence for patient counselling.

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Keywords: Delivery, obstetric; Fetal death; Obstetrics; Questionnaires; Umbilical cord

Introduction

The occurrence of nuchal cord is very common. In an audit of all singleton deliveries at our hospital in 2010, the incidence of nuchal cord at delivery was 26.9% of a total 5166 deliveries. The management of nuchal cord differs in different countries and among obstetricians. In mainland China, presence of nuchal cord is a strong indicator for Caesarean section. It accounted for 16% to 25% of sections at a teaching hospital and some regional hospitals in China^{1,2}. Nonetheless local obstetric opinion of the impact of nuchal cord on fetal outcome, mode of delivery, and management has not been explored in Hong Kong. Therefore, we conducted this questionnaire survey.

fetal outcome, mode of delivery and management, in both Chinese and English versions were mailed to all registered Hong Kong specialists in obstetrics and gynaecology (O&G) in July 2012. Recipients were instructed to reply by either fax or mail in a prepaid return envelope. Each questionnaire had a serial number linked to a specialist's name in a database. This was solely used to enable a reminder to be sent after 2 months if no reply had been received. This number was blinded for subsequent analysis to maintain anonymity. The study was approved

Methods

Questionnaires about the impact of nuchal cord on

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by the ethics committee of the Hospital Authority. The questionnaires are attached in Appendices 1 and 2.

SPSS Windows version 20.0 was used for statistical analysis. Chi-square test and Fisher’s exact test were used when appropriate. All differences were defined as being statistically significant at $p < 0.05$.

Results

There were a total of 381 registered O&G specialists in July 2012, of whom 160 responded within the first 2 months. After a reminder, a further 33 replied. Therefore the total response rate was 50.7% (n=193). The demographic particulars of the respondents are summarised in Table 1.

The perceived percentage of nuchal cord at term was evaluated by a visual analogue scale from 0 to 100%. Among the respondents, 51.6% considered the percentage of less than 20%. The perceived accuracy of an ultrasound scan to detect nuchal cord was similarly assessed: 55.0% viewed the accuracy to be less than 70%.

On the impact on fetal outcome, 72.4% replied that more turns of nuchal cord was associated with more adverse outcome. In all, 34% and 22.8% considered that nuchal cord could cause intrauterine death and intrapartum fetal death / neonatal death, respectively. For mode of delivery 51.6% thought that it reduced the possibility of successful normal vaginal delivery, and 53.9% thought that it increased the rate of assisted vaginal delivery. In their daily practice, 23.8% of specialists routinely screened for nuchal cord when performing prenatal ultrasound in the third trimester, and 46.9% informed their patients if the result was positive. Nonetheless only 1.1% would deliver the fetus earlier if nuchal cord was detected at term, and 4.7% would advise Caesarean section (Table 2).

There were no significant differences in the cited incidence of nuchal cord by O&G specialists working in public hospitals versus those working in private practice, nor between maternal fetal medicine (MFM) subspecialists and non-MFM specialists. A significantly higher percentage of specialists (61.8%) with more than 16 years of practice after obtaining Fellowship of the Hong Kong Academy of Medicine (FHKAM) considered the incidence of nuchal cord to be less than 20% ($p = 0.02$). For the perceived accuracy of ultrasound detection of nuchal cord, there were no differences between specialists in private / public practice or years of practice after obtaining FHKAM. Significantly fewer MFM specialists thought that the accuracy was less than 70% compared with non-MFM specialists (35.7% vs.

58.4%; $p=0.04$) [Table 3].

There were no differences in view of nuchal cord on fetal outcome and mode of delivery between public and private specialists. There were also no differences regarding MFM status and years of practice. More specialists in private practice routinely looked for nuchal cord on ultrasound scans compared with those working in the Hospital Authority / public organisations (35.7% vs. 0%, $p < 0.001$). In addition, significantly more private than public specialists would inform patients when nuchal cord was detected (57.4% vs. 25.4%, $p < 0.001$). More specialists with ≥ 16 years of practice routinely screened for nuchal cord, and more informed their patients if nuchal cord was noted. Nonetheless there were no differences between the subgroups in advice for Caesarean section (Table 4).

Discussion

Nuchal cord is common: an approximate 25% incidence revealed by our local audit is comparable with other studies³⁻⁵. Nonetheless in this questionnaire survey, around half of respondents underestimated the incidence. With the advance of ultrasound and use of colour flow Doppler, the sensitivity of ultrasound in detecting nuchal cord has been determined to be 79% to 96.8%^{6,7}. It is thus surprising that more than half of our respondents underestimated the accuracy at less than 70%. The higher

Table 1. Demographic data of specialists in obstetrics and gynaecology (n=193)

Demographics	Data
Place of practice	
Hospital Authority or public institutions	64 (33.2%)
Private practice	129 (66.8%)
HKCOG / RCOG–accredited MFM specialist	
Yes	30 (15.5%)
No	163 (84.5%)
Years of practice after obtaining FHKAM	
0-5 Years	28 (14.5%)
6-10 Years	28 (14.5%)
11-15 Years	47 (24.4%)
≥ 16 Years	90 (46.6%)

Abbreviations: FHKAM = Fellow of the Hong Kong Academy of Medicine; HKCOG = Hong Kong College of Obstetricians and Gynaecologists; MFM = maternal and fetal medicine; RCOG = Royal College of Obstetricians and Gynaecologists

Table 2. Views of obstetricians and gynaecologists of nuchal cord impact on fetal outcome, mode of delivery, and their practice on nuchal cord*

Item	Yes	No
View of nuchal cord on fetal outcomes		
Nuchal cord of more turns are more dangerous	139 (72.4)	53 (27.6)
Nuchal cord can cause intrauterine death	64 (34.0)	124 (66.0)
Nuchal cord can cause intrapartum fetal death or neonatal death	42 (22.8)	142 (77.2)
View of nuchal cord on mode of delivery		
Nuchal cord will reduce the chance of successful normal vaginal delivery	99 (51.6)	93 (48.4)
Nuchal cord will increase the chance to have assisted vaginal delivery such as vacuum extraction and forceps delivery	104 (53.9)	89 (46.1)
Their practices on nuchal cord		
Will routinely look for nuchal cord when performing ultrasound at third trimester	46 (23.8)	147 (76.2)
Will inform patient if there is nuchal cord on ultrasound	90 (46.9)	102 (53.1)
Will deliver the fetus earlier on detection of nuchal cord at term	2 (1.1)	188 (98.9)
Advise patient for Caesarean section due to nuchal cord	9 (4.7)	181 (95.3)

* Data are shown as No. (%) of subjects. Percentages were calculated after exclusion of those with missing answers

Table 3. Views of obstetricians and gynaecologists on the incidence of nuchal cord and accuracy of ultrasound in detecting nuchal cord*

Demographics	Considered the incidence of nuchal cord being <20%	p Value	Considered the accuracy of ultrasound being <70%	p Value
Place of practice		0.36		0.77
Work in Hospital Authority or public institution	29/63 (46.0)		35/61 (57.4)	
Work in private practice	70/129 (54.3)		69/128 (53.9)	
Accreditation of MFM		1.00		0.04
MFM specialists	15/29 (51.7)		10/28 (35.7)	
Non-MFM specialists	84/163 (51.5)		94/161 (58.4)	
Years of practice after obtaining FHKAM		0.02		0.74
0-5 Years	13/28 (46.4)		13/28 (46.4)	
6-10 Years	15/28 (53.6)		17/28 (60.7)	
11-15 Years	16/47 (34.0)		25/46 (54.3)	
≥16 Years	55/89 (61.8)		49/87 (56.3)	

Abbreviations: FHKAM = Fellow of the Hong Kong Academy of Medicine; MFM = maternal and fetal medicine

* Data are shown as No. (%) of subjects. Percentages were calculated after exclusion of those with missing answers

accuracy estimated by MFM specialists was probably due to more liberal use of colour flow Doppler in evaluation of nuchal cord.

Whether nuchal cord is associated with poor outcome is controversial. Some studies have shown that nuchal cord is associated with an increased prevalence of variable fetal heart rate decelerations during labour and an

increased incidence of umbilical artery academia, as well as a higher incidence of lower 1-minute Apgar score and meconium stained liquor^{8,9}. Nuchal cord has also been proposed to result in cord compression during labour, leading to increased arterial resistance with consequent fetal bradycardia and fall in fetal cardiac output and metabolic acidosis. Nevertheless most studies have shown that nuchal cord is not associated with lower Apgar scores

Table 4. Between-group comparisons of the views of nuchal cord on fetal outcomes, mode of delivery, and the practices on nuchal cord*

Characteristic	Hospital Authority / public organisation vs. private practice		
	Public practice (n=64)	Private practice (n=129)	p Value
View of nuchal cord on fetal outcomes			
Think that nuchal cord of more turns are more dangerous	42/63 (66.7%)	97/129 (75.2%)	0.29
Think that nuchal cord can cause intrauterine death	23/63 (36.5%)	41/125 (32.8%)	0.73
Think that nuchal cord can cause intrapartum fetal death or neonatal death	13/64 (20.3%)	29/120 (24.2%)	0.68
View of nuchal cord on mode of delivery			
Think that nuchal cord will reduce the chance of successful normal vaginal delivery	28/64 (43.8%)	71/128 (55.5%)	0.17
Think that nuchal cord will increase the chance to have assisted vaginal delivery such as vacuum extraction and forceps delivery	32/64 (50.0%)	72/129 (55.8%)	0.54
Their practices on nuchal cord			
Will routinely look for nuchal cord when performing USG at third trimester	0/64	46/129 (35.7%)	<0.001
Will inform patient if there is nuchal cord on USG	16/63 (25.4%)	74/129 (57.4%)	<0.001
Will deliver the fetus earlier on detection of nuchal cord at term	1/64 (1.6%)	1/126 (0.8%)	1.00
Will advise patient for Caesarean section due to nuchal cord	1/63 (1.6%)	8/127 (6.3%)	0.28

Abbreviations: FHKAM = Fellow of the Hong Kong Academy of Medicine; MFM = maternal and fetal medicine; USG = ultrasound

* Data are shown as No. (%) of subjects. Percentages were calculated after exclusion of those with missing answers

after 5 minutes or with an increase in Caesarean sections, neonatal intensive care unit admissions, or perinatal mortality^{5,10-13}. It is postulated that although cardiac output falls during acute compression of the umbilical vessels, the fetus can maintain tissue oxygenation through its reserve provided compression is not prolonged. In our study, a significant proportion of O&G specialists believed that nuchal cord could cause intrauterine death and intrapartum death / neonatal death (34% and 22.8% respectively). Half of them perceived that nuchal cord decreased the chance of successful vaginal delivery. No significant differences were found on the views of nuchal cord on fetal outcomes and mode of delivery between those working in Hospital Authority / public institutions and private practice. This may increase patient anxiety.

In our hospital, it is not routine to screen for nuchal cord on antenatal ultrasound scans and even if incidentally noted, this is not disclosed to patients, even upon active enquiry. The intention is to avoid causing unnecessary anxiety since intrapartum management and timing and mode of delivery will not be affected. This is likely to also be the case in public institutions where no specialists

admitted to routine screening for nuchal cord.

It may seem to be contradictory that although one-third of private specialists routinely screen for nuchal cord and over half of them would inform their patients if there was nuchal cord on ultrasound, only 6% would advise Caesarean section for this condition. It is probable that a significant number of Caesarean sections may still be performed due to maternal request (due to induced increased anxiety).

Nuchal cord continues to be an indication for Caesarean section in mainland China^{1,2}. This practice may be a source of increased anxiety for our patients, many of whom are new immigrants or have received information from friends or relatives in the mainland. There are no current local data on the impact of nuchal cord on fetal outcome and mode of delivery. There is a need to reflect the common incidence of nuchal cord and to conduct local studies on the impact of nuchal cord on fetal outcome and mode of delivery in order to provide more information and evidence to guide clinical management and patient counselling.

MFM vs. non-MFM specialists			Specialists with different years of practice after FHKAM				
MFM (n=30)	Non-MFM (n=163)	p Value	0-5 Years (n=28)	6-10 Years (n=28)	11-15 Years (n=47)	≥16 Years (n=90)	p Value
22/29 (75.9%)	117/163 (71.8%)	0.82	18/28 (64.3%)	21/28 (75.0%)	31/47 (66.0%)	69/89 (77.5%)	0.37
8/28 (28.6%)	56/160 (35.0%)	0.66	11/28 (39.3%)	7/27 (25.9%)	14/47 (29.8%)	32/86 (37.2%)	0.59
6/28 (21.4%)	36/156 (23.1%)	1.00	4/27 (14.8%)	7/28 (25.0%)	7/46 (15.2%)	24/83 (28.9%)	0.23
19/30 (63.3%)	80/162 (49.4%)	0.23	16/28 (57.1%)	13/28 (46.4%)	24/47 (51.1%)	46/89 (51.7%)	0.89
20/30 (66.7%)	84/163 (51.5%)	0.18	14/28 (50.0%)	18/28 (64.3%)	25/47 (53.2%)	47/90 (52.2%)	0.68
8/30 (26.7%)	38/163 (23.3%)	0.87	1/28 (3.6%)	4/28 (14.3%)	11/47 (23.4%)	30/90 (33.3%)	0.01
12/29 (41.4%)	78/163 (47.9%)	0.66	7/28 (25.0%)	11/28 (39.3%)	23/47 (48.9%)	49/89 (55.1%)	0.04
0/29	2/161 (1.2%)	1.00	0/28	1/28 (3.6%)	1/47 (2.1%)	0/87	0.33
2/28 (7.1%)	7/162 (4.3%)	0.62	0/28	1/28 (3.6%)	3/47 (6.4%)	5/87 (5.7%)	0.58

Conclusion

A significant proportion of O&G specialists believe that nuchal cord leads to adverse fetal outcome and affects

the mode of delivery. A large local study of nuchal cord should be conducted to guide clinical management and enable accurate advice to be given to patients.

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Appendix 1. Questionnaire to obstetrics and gynaecology specialists (English version)

Part 1: View on cord round neck

- 1) How many fetuses will you expect to have cord round neck at term (≥ 37 weeks of gestation)?
(Please mark an 'X' on the line for your answer)



- 2) Do you think that cord round neck for more turns is more dangerous? (For example, is cord round neck for two turns more dangerous than one turn?)

Yes No

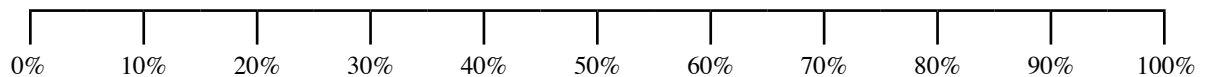
- 3) Do you routinely look for cord round neck when ultrasound scan is performed for pregnant patients at third trimester (≥ 28 weeks of gestation)?

Yes No

- 4) Do you inform patient if there is cord round neck detected on ultrasound scan?

Yes No

- 5) What do you think is the accuracy of ultrasound in diagnosing cord round neck?
(Please mark an 'X' on the line for your answer)



- 6) Do you advise patient to deliver the fetus earlier if there is cord round neck detected on ultrasound at term?

Yes No

- 7) Do you think cord round neck is a cause of intrauterine death?

Yes No

- 8) Do you think that cord round neck reduces the chance of successful normal vaginal delivery?

Yes No

- 9) Do you think that cord round neck increases the chance of instrumental deliveries?

Yes No

- 10) If there is sonographically detected cord round neck, do you advise patient to have Caesarean section when there are no other medical / obstetric indications for Caesarean section? (Maternal anxiety is not considered an indication here.)

Yes No

- 11) Do you think cord round neck is a cause of intrapartum or neonatal death?

Yes No

Part 2: Demographic data

- a) Where is your current place of practice?

Hospital Authority
 Department of Health
 Private practice
 Other public organisations (e.g. Family Planning Association)

- b) How many years ago did you obtain the FHKAM (O&G) ?

0-5 6-10 11-15 16 Years or more

- c) Are you a HKCOG / RCOG-accredited Maternal and Fetal Medicine (MFM) specialist?

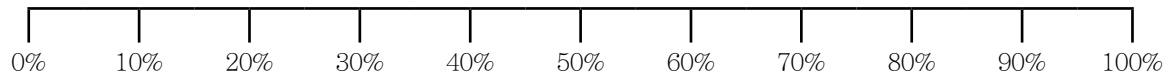
Yes No

- End -

Appendix 2. Questionnaire to obstetrics and gynaecology specialists (Chinese version)

第一部份：對胎兒臍帶纏頸的看法

- 1) 你認為有多少胎兒在足月時（懷孕37週或以上）會有臍帶纏頸的情況？
（請在線上你認為的百份比位置畫上‘X’）

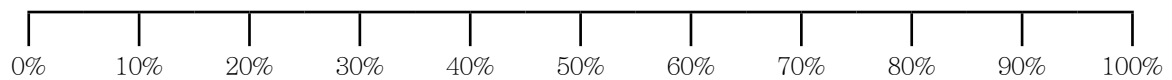


- 2) 你認為臍帶纏頸的圈數越多是否越危險？（例如：臍帶纏頸繞兩個圈是否比一個圈危險？）
 是 不是

- 3) 你為懷孕28週或以上（3rd trimester）的孕婦照超聲波時會留意胎兒有否臍帶纏頸嗎？
 會 不會

- 4) 若你照超聲波時發現胎兒臍帶纏頸，你會告訴病人嗎？
 會 不會

- 5) 你認為用超聲波去診斷胎兒臍帶纏頸有多準確？
（請在線上你認為的百份比位置畫上‘X’）



- 6) 若胎兒在足月時超聲波發現有臍帶纏頸的情況，你會建議病人提早分娩嗎？
 會 不會

- 7) 你認為臍帶纏頸在懷孕期間可導致胎兒胎死腹中（intrauterine death）嗎？
 會 不會

- 8) 你認為臍帶纏頸會減低順產的機會嗎？
 會 不會

- 9) 你認為臍帶纏頸會增加需要用真空吸盤或產鉗助產的機會嗎？
 會 不會

- 10) 若超聲波發現胎兒有臍帶纏頸的情況，但沒有其他產科的原因必須剖腹分娩（病人擔憂maternal anxiety在此不視作產科原因），你會建議病人用剖腹分娩的方法去誕下胎兒嗎？
 會 不會

- 11) 你認為臍帶纏頸在分娩期間可導致胎兒死亡嗎？
 會 不會

第二部份：統計資料

- a) 你在哪個機構執業？

- 醫院管理局
 衛生署
 私人執業
 其他公營機構（例如：家計會）

- b) 你在幾多年前獲取婦產科專科資格？

- 0-5年 6-10年 11-15年 16年或以上

- c) 你是否香港婦產科學院或英國皇家婦產科醫學院認可的母胎醫學科（Maternal and Fetal Medicine）的專科醫生？

- 是 不是

- 完 -