has been found that patients with genetic disorders had a greater need for hospital admission and were hospitalized for longer durations than were those without genetic disorders [14].

However, recent advances in treatment are likely to improve the survival of individuals with congenital malformations, which, in turn, is likely to increase the rates of readmission to pediatric intensive care units (PICUs) [16]. Several studies have assessed the role of genetic disorders in pediatric mortality and hospitalization [2, 6, 7, 16]. Congenital malformations and chromosomal abnormalities pose serious challenges for perinatal health care in this country, as they are the leading contributors to the infant mortality rate in Japan.

In this study, we assessed the reasons for admissions and hospitalization to the high-care unit (HCU) of a major tertiary children's referral center in Kanagawa Prefecture, Japan, and compared our findings to those of a study of this unit 30 years ago. To elucidate the impact and contribution of birth defects and genetic diseases on pediatric hospitalization, we studied the reason for hospitalization, underlying diagnoses, and duration of hospitalization in this children's hospital in Japan.

Materials and methods

Permission for the study was obtained from the Ethical Committee of our medical center.

We retrospectively analyzed the cases of children hospitalized at the HCU of Kanagawa Children's Medical Center (KCMC) between June 2007 and December 2008. KCMC is a major tertiary children's referral center for pediatric cardiology, surgery, and cancer cases and serves a large area in Kanagawa Prefecture, Japan. It has an institute for the severely handicapped, a PICU, a neonatal intensive care unit, and an HCU. In contrast to the PICU, which admits patients who have undergone cardiovascular or neurosurgery, the HCU specializes in pediatric patients with other acute conditions. All of the patients were included if they were admitted to the HCU from the emergency room, operating room, or inpatient ward. KCMC, with 419 beds, is the only specialized pediatric hospital in Kanagawa Prefecture, where the total number of births is 80,000 annually [8, 9]. About 8,500 patients (male/female, 1:1) were admitted to KCMC in 2007, and the average of hospital stay was 15.3 days.

We summarized and reviewed the medical charts of all patients admitted to the HCU. The charts and summaries were reviewed for age, sex, duration of hospitalization, underlying disease, and reason for admission. Subcategories were created for the underlying diseases and reason for admission.

The underlying disease was classified into two main categories: genetic conditions and acquired (non-genetic) conditions. Genetic conditions were considered to include chromosomal abnormalities, recognizable malformation and dysplasia, multiple malformations, isolated malformations (e.g., those related to the heart, central nervous system (CNS), and respiratory and gastrointestinal tracts), other single-gene defect-related conditions, mitochondrial diseases, and metabolic disorders (Table 1). All cases of chromosomal abnormalities and multiple malformations were examined using standard karyotyping. Cases of recognizable malformation/dysplasia were ascertained by clinical dysmorphologists (H.Y., N.F., and K.K.). Acquired conditions were considered to include perinatal complications, trauma, neoplasm, and sequelae of severe infectious conditions.

The reasons for admission were classified as problems of the respiratory system, CNS, heart, gastrointestinal tract, kidneys and urinary tract, infectious diseases, post-operative management, and unknown condition. Those cases that did not fall into these categories were placed into a category called "others."

Statistical analyses were performed to compare the duration of hospitalization and the age distribution, using StatView version 5.0 (SAS Institute, Inc; Cary, NY). Categorical data were reported as counts and percentages, and continuous data as mean (SD) or median values. Statistical differences for categorical variables were determined by using chi-squared analyses. Median differences were compared by Mann–Whitney *U* test.

Results

A total of 900 admissions, consisting of 687 individual cases with 200 recurrent admissions, were reviewed. Sixteen admissions were excluded from the study because of insufficient information regarding the underlying causes for admission.

The median age at admission was 3.5 years (range, 1 day–32.5 years), and the sex ratio was 1.36 (396 males and 291 females). The median lengths of hospitalization in the HCU were 4 days. Table 2 shows the distribution of the 884 admissions across the different categories of causes for admission. Most patients were admitted for common medical problems, including respiratory problems, post-operative management, and CNS problems. Of the 298 admissions for respiratory problems, most cases involved respiratory infection, including pneumonia and bronchitis. Admissions for post-operative management accounted for 30.7% cases (271 of 884 admissions), while CNS problems such as convulsions, encephalitis, and meningitis accounted for 16.3% (144 of 884 admissions).

Table 1 Definitions of categories

Category	Examples
Chromosomal syndromes	Down syndrome, trisomies 13 and 18, cri du chat syndrome, and Wolf–Hirschhorn syndrome
Recognizable malformation/dysplasia	22q11.2 deletion syndrome, CHARGE syndrome, and VATER association, Lowe syndrome, achondroplasia, Crouzon syndrome, Noonan syndrome, and Treacher–Collins syndrome
Multiple malformations	
Isolated malformations	
Congenital heart diseases	VSD ASD, AVSD, TGA, and DORV
Central nervous system malformations	Schistorrhachis, hydrocephalus, and meningoencephalocele
Gastrointestinal malformations	Diaphragmatic hernia, biliary atresia, and congenital intestinal obstruction
Respiratory system malformations	CCAM and tracheal stenosis
Other isolated malformations	Cleft palate and cleft lip
Single-gene defect	Metabolic diseases, spinal muscular atrophy, and spinocerebellar degeneration
Mitochondrion	

The classification of the underlying conditions of the 687 patients is shown in Table 3. In 13 cases, the data for identifying the underlying disease were insufficient (e.g., charts were missing). These cases were categorized as "unknown condition." Of the total 687 patients, 372 (54.1%) had genetic disorders and the remaining 302 (44.0%) had acquired conditions unrelated to genetic disorders, including perinatal complications, neoplasm, and trauma. Among the 372 patients with genetic disorders, 72 had chromosomal abnormalities, with Down syndrome (29 cases) being the most common underlying disorder. Seventy patients had recognizable malformations and dysplasia, with conditions such as osteogenesis imperfecta, 22q11.2 deletion syndromes, CHARGE syndrome, and VATER association. Multiple malformations with unrecognizable patterns were present in 38 cases while isolated malformations, including CNS malformation, congenital heart disease, and gastrointestinal malformation were present in 160 cases.

We also summarized the reasons for the total of 884 admissions, according to the underlying condition (genetic or acquired). Of these admissions, 200 were readmissions. Patients with genetic disorders and malformations had a greater tendency to be hospitalized repeatedly as compared with those with acquired conditions (Fig. 1). In both genetic and acquired condition categories, respiratory disease, post-operative management, and CNS problems were the major medical problems leading to admission.

We further compared age distribution and the lengths of hospitalization between the groups with genetic and acquired disorders (Table 4). The patients with genetic

Table 2 Medical problems for admission (N=884)

Causes for admission	Number	Percent
Respiratory problems	298	33.7
Post-operative management	271	30.7
CNS problems	144	16.3
Gastrointestinal problems	35	4.0
Cardiac diseases	23	2.6
Other infectious state	23	2.6
Examination	21	2.4
Kidney and urinary tract problems	14	1.6
Other	55	6.2
Total	884	100.0

Table 3 Classification of underlying diseases in 678 patients

Underlying diseases	Number	Percent
Genetic disorders and malformations (subtotal)	372	54.1
Chromosomal abnormalities	(72)	10.5
Recognizable malformation/dysplasia	(70)	10.2
Multiple malformations	(38)	5.5
Isolated malformations	(subtotal:160)	23.3
Central nervous system malformation	(71)	10.3
Congenital heart disease	(35)	5.1
Gastrointestinal malformation	(32)	4.7
Respiratory system malformation	(9)	1.3
Other isolated malformations	(13)	1.9
Single-gene defect	(26)	3.8
Mitochondrion	(6)	0.9
Acquired non-genetic conditions (subtotal)	302	44.0
Perinatal complications	(66)	9.6
Neoplasm	(38)	5.5
Trauma(non-accidental and accidental)	(27)	3.9
Infection	(16)	2.3
Other	(155)	22.6
Unknown	13	1.9
Total	687	100.0

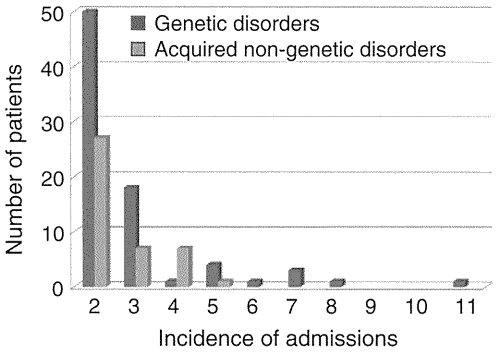

Fig. 1 Comparison of the incidence of admission between the groups with genetic disorders and acquired disorders. In both groups, a total of 200 patients were readmitted. The group with genetic disorders generally required frequent readmission

disorders were significantly younger than those with acquired conditions (median age, 2.0 vs. 4.9 years; $P<0.0001$). There is no significant difference in the length of hospitalization between the patients with genetic disorders and those with acquired conditions (median, 4 vs. 4 days; $P=0.26$), but some patients with genetic disorders had much longer hospitalization (mean, 13.0 vs. 7.0 days; $P=0.007$; range, 1–979 days). Among the reasons for admission, respiratory problems tended to have a longer duration of hospitalization for patients with genetic disorders than for those with acquired conditions (median, 7 vs. 5 days; $P=0.17$).

Discussion

Our study shows that genetic disorders and malformations account for a significant proportion of cases requiring admission to the HCU. Additionally, the rate of recurrent admission was higher among patients with genetic disorders and malformations than among those with acquired non-genetic conditions. This finding is in agreement with those of previous reports for other countries [4, 13].

Several studies from different countries have previously suggested that genetic conditions and malformations and the associated mortality and morbidity have a significant impact on the cost burden for society and the patients' families. Cunniff et al. reported that 19% of deaths in a PICU were in cases of heritable disorders [1]. Stevenson and Carey reported that the 34.4% of deaths in a children's hospital were due to malformations and genetic disorders [15]. On the basis of a population-based study, Yoon et al. reported that the overall rate of hospitalization was related to birth defects and genetic diseases, and varied with age and race/ethnicity [16]. McCandless et al. reported the enormous impact of genetic disease on inpatient pediatrics and the health care system in both admission rates and the total hospital charges [11]. These studies emphasize the importance of understanding the impact that genetic diseases have on mortality and healthcare strategies [15]. Furthermore, it is also clear that early recognition of the underlying disorders is necessary for optimal management of patients with genetic disorders.

Our study highlights another aspect related to the impact of genetic disorders and malformations. In 1981, Matsui et al. analyzed the cases of 18,736 children of total admission during 1975–1979 to KCMC and found that 44% had genetic disorders and malformations [10]. Although our study period and ward are limited to those in the HCU, the patients with genetic disorders and malformations had consistently significant impact in KCMC during the ensuing three decades. Further, it emphasizes that medical care for acute conditions and surgical procedures frequently requires highly specialized knowledge of unusual disease conditions and should be provided in consultation with specialists such as clinical geneticists.

Table 4 Comparison of patients with genetic disorder vs. acquired condition on ages at admission and lengths of stay

	Genetic disorders		Acquired conditions		
	Median (range)	*n*	Median (range)	*n*	*P*
Ages	2.0 years (1 day–27.0 years)	372*	4.9 years (9 days–32.5 years)	302*	<0.0001
Length of hospitalization (days)					
Respiratory problem	7 (1–979)	182	5 (1–97)	109	0.17
CNS	4 (1–54)	73	4 (1–207)	68	0.61
Cardiovascular	4 (2–11)	13	4 (2–24)	8	0.94
Gastrointestinal	5.5 (1–37)	22	5 (2–15)	12	0.60
Kidney and urinary tract	3 (2–12)	5	8 (2–12)	9	0.32
Sepsis	3.5 (2–9)	14	7 (2–20)	9	0.19
Post-operative care	2 (1–49)	174	2 (1–62)	93	0.18
Total	4 (1–979)	518	4 (1–207)	366	0.26

*For the patients who have recurrent admissions, the only first admission was calculated

Although the strategies for management of respiratory infection, by means of newly developed antibiotics and mechanical ventilators, and surgical intervention for infants with malformations, have improved, the general strategies for the medical treatment of genetic disorders and malformations remain to be clarified. Hall commented on the report by Yoon et al. [16] and emphasized the significance of basic research on the human genome and developmental genetics [3]. As shown in Table 2, genetic disorders and malformations include rare diseases, which, although uncommon, remain an important public-health issue and a challenge for the medical community [12].

Our study had the limitations of genetic studies and evaluation in cases with multiple malformations and other isolated malformations. The underlying conditions of most patients in this study were ascertained by clinical geneticists, but high-resolution genome analysis with arrays using comparative genomic hybridization was applied in only limited cases. Recently, research attention has focused to a large extent on rare genetic disorders and Mendelian diseases, because of their significant effect on human health, with the aim of identifying disease-related genetic variations. Re-evaluation and classification of underlying disorders, especially in the case of multiple congenital anomalies in undiagnosed patients, are required for further analysis.

Another limitation of our study is estimation of the financial burden of the group of patients with a genetic background. McCandless et al. showed that the disorders with genetic determinant account for 81% of the total hospital charges [11]. Their results are consistent with those of Hall et al. in 1978 [4]. Further analysis of financial burden in our study may provide useful information for improvement of health care systems.

In conclusion, we report here the proportion of genetic disorders and malformations among cases encountered at the HCU of a tertiary children's medical center in Japan. Over 30 years, the proportion of admissions attributed to genetic disorders and malformations has impact and currently accounts for more than half of admissions to this facility. These results firstly indicate improvements in medical care for patients with genetic disorders and malformations and further highlight the large proportion of cases with genetic disorders. As these cases require highly specialized management, the involvement of clinical geneticists in HCUs at children's hospitals is crucial. Eventually, a better fundamental understanding of genetic disorders and malformations may lead to further improvements in medical care and may reduce the impact of these conditions on the patients and their families.

Acknowledgments The authors are grateful to Dr. Hiroyuki Ida (Tokyo Jikei University) for his valuable comments. This research was supported in part by a grant-in-aid from the Ministry of Health, Labor and Welfare, Japan.

Conflict of interest The authors declare no conflict of interest.

References

1. Cunniff C, Carmack JL, Kirby RS, Fiser DH (1995) Contribution of heritable disorders to mortality in the pediatric intensive care unit. Pediatrics 95:678–681
2. Garrison MM, Jeffries H, Christakis DA (2005) Risk of death for children with Down syndrome and sepsis. J Pediatr 147:748–752
3. Hall JG (1997) The impact of birth defects and genetic diseases. Arch Pediatr Adolesc Med 151:1082–1083
4. Hall JG, Poweres EK, McIlvaine RT, Ean VH (1978) The frequency and financial burden of genetic disease in a pediatric hospital. Am J Med Genet 1:417–436
5. Health and Welfare Statistics Association (2010) Mortality rate of infant. J Health Welfare Statist 57:63–65, in Japanese
6. Heron M, Sutton PD, Xu J, Vetura SJ, Strobino DM, Guyer B (2010) Annual summary of vital statistics: 2007. Pediatrics 125:4–15
7. Hudome SM, Kirby RS, Senner JW, Cunniff C (1994) Contribution of genetic disorders to neonatal mortality in a regional intensive care setting. Am J Perinatol 11:100–103
8. Kuroki Y, Konishi H (1984) Current status and perspectives in the Kanagawa Birth Defects Monitoring Program (KAMP). Cong Anom 24:385–393
9. Kurosawa K, Imaizumi K, Masuno M, Kuroki Y (1994) Epidemiology of limb-body wall complex in Japan. Am J Med Genet 51:143–146
10. Matsui I, Naito K, Hanawa Y et al (1981) Impact of the congenital birth defects on children's health care. J Jpn Pediatr Soc 85:889–897, in Japanese
11. McCandless SE, Brunger JW, Cassidy SB (2004) The burden of genetic disease on inpatient care in a children's hospital. Am J Hum Genet 74:121–127
12. Schieppati A, Henter J-I, Daina E, Aperia A (2008) Why rare diseases are an important medical and social issue. Lancet 371:2039–2041
13. Scriver CR, Neal JL, Saginur R, Clow A (1973) The frequency of genetic disease and congenital malformation among patients in a pediatric hospital. Can Med Assoc J 108:1111–1115
14. Sever L, Lynberg MC, Edmonds LD (1993) The impact of congenital malformations on public health. Teratology 48:547–549
15. Stevenson DA, Carey JC (2004) Contribution of malformations and genetic disorders to mortality in a children's hospital. Am J Med Genet 126A:393–397
16. Yoon PW, Olney RS, Khoury MJ, Sappenfield WM, Chavez GF, Taylor D (1997) Contribution of birth defects and genetic diseases to pediatric hospitalizations. Arch Pediatr Adolesc Med 151:1096–1103

NICU 最前線

神奈川県立こども医療センター新生児科医長，国際認定ラクテーション・コンサルタント

大山牧子
おおやま・まきこ

7 口唇・口蓋裂を持つ赤ちゃんの直接授乳はどう援助する？

ケース紹介

G子さんは初めての妊娠中に胎児の左唇裂を指摘され，スクリーニングで他の合併奇形がないこと，元気に生まれたら母子同室で過ごすこと，形成外科をはじめ専門家の診察を受けることを知らされた．G子さんは母乳で育てるつもりであった．新生児科医から，直接授乳できること，裂の状況によってデバイスを用いて搾乳した母乳を追加することを告げられた．

ここを★チェック

- □ 妊娠中から母子の早期接触は保証されているか？
- □ 母乳分泌の確立と維持のための支援策は講じられているか？
- □ 直接授乳の支援は行われているか？
- □ 適切な補足の方法が選択・実践されているか？

早期接触の保証

合併奇形がなく，出生時の全身状態が良い口唇・口蓋裂を持つ児は，健康に生まれた児と同様に，たっぷりと早期接触を行うことができる．胎児診断されていれば，あわてて診察することもない．早期接触は児が本能から乳房を探し当て，乳房に吸着するものであって，無理矢理吸わせたり，特別な姿勢をとることはしない．

十分な早期接触の後，小児科医の診察を受け，口唇・口蓋裂のタイプと合併奇形の有無を確認する．合併奇形がないと判断したら，健康に生まれた児と同様の扱いとする．

母乳分泌の確立と維持

直接授乳だけでは飲み取られる量が少なく，母乳を出すための刺激が得られにくいので，産後早期から２～３時間ごとに搾乳し，作られる母乳の量を多めにしておく．

直接授乳の支援

1．児に合った空腹のサインを読み取る

普通は，そわそわ，口を動かす，指しゃぶり，音をたてるなどの，そろそろ飲みたい様子が見られたら授乳する．児によっては，しっかり空腹になってからがよいこともある．お腹が空いていらいらしたり，泣き出してしまったら，少しの搾母乳・人工乳を与えて落ちついてからがよいこともある．

2．授乳姿勢

授乳姿勢は交差抱き・脇抱き・立て抱きのいずれでも，左右それぞれの乳房ごとに，最も吸着しやすい方法を母親と一緒に探す．口蓋裂でむせやすい場合や小顎症の場合は，立て抱きでややリクライニングの姿勢をとり，必要に応じて人差し指をおとがいに当てて支えると吸着し続けやすいことがある（図）．

3．直接授乳の実際

- 乳房を含ませる前に射乳反射[注1)]が起こるくらいまで搾乳し，母乳がすぐに出てくるようにしておく．こうすることで，児は乳房からすぐに飲むことができ，エネルギー消費が少なくて済む．
- 乳房の先を口蓋の裂のない方向に向けるとよい場合もある．
- 授乳中，常に母乳が流れ続けるように，乳房圧迫[注2)]を行う．
- 頻回に左右の乳房を交代しながら飲ませる．

注１：飲み始めてしばらくして乳汁が勢いよく出てくること．母親によっては，飲ませ始めてすぐの場合と少ししてからの場合とがある．児の飲み方が速いピッチから，ゆっくりとなり，ごくごく飲む音が出てくることで分かる．

注２：児が吸啜しているときに，乳房を支える指の位置のまま，しばらく乳房を圧迫すると，乳汁の流れが速くなるので，児はしっかり覚醒して飲め，母親は母乳を効率よく与えることができる．指の位置を変えて同じ側の乳房を何回か圧迫する．

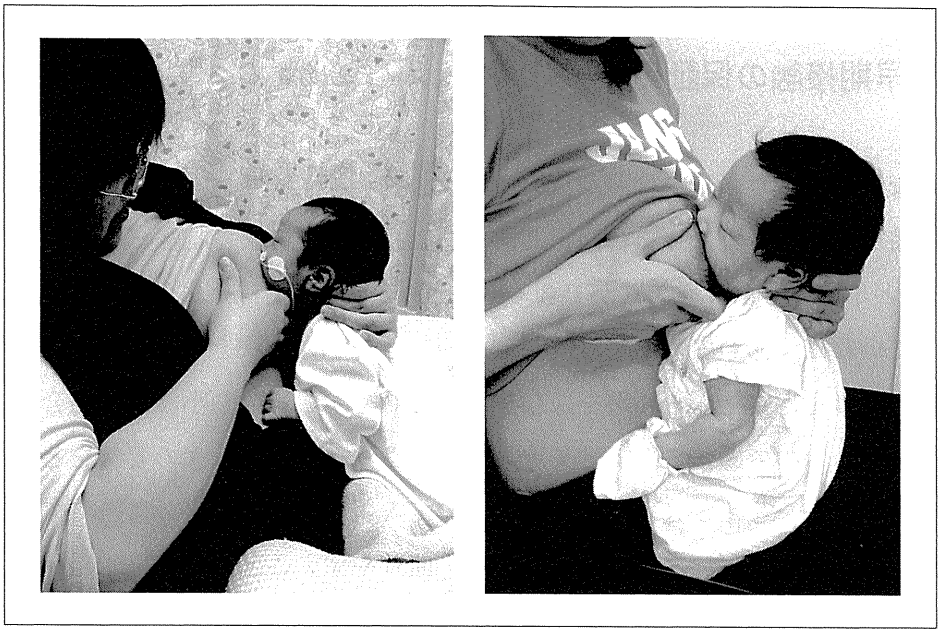

図　またがり抱き（straddle）
母親の大腿に児の下肢をまたがらせるように抱き，一方の手で児の頸部をしっかりと支え，もう片方の手で乳房を支える．図ではさらに人差し指で児の下顎を支えている．

射乳反射[注1)]が終わったら早めに反対側に移ることを繰り返す．

- 短時間の授乳を頻回に行う．疲れやすく，空気を飲み込みやすいので，早めに授乳を切り上げ，げっぷをさせる．飲ませる回数を多くして哺乳量を保つ．
- 児の体重増加をチェックする（生後6カ月以内は18g/日以上）．

口唇裂だけや口唇裂と顎裂だけで口蓋裂を伴わない児は，母乳分泌が良ければ乳房からの授乳だけで十分量を飲み取ることができることが多い．それでも，産後しばらくの間は，授乳に相当時間がかかるが，児が大きくなれば授乳時間が短くなることを母親に伝える．

口蓋裂を伴う児は，乳房からの授乳だけで十分量を飲み取ることが困難なことが多い．授乳の際，吸い付いていられるように，親指と他の4本の指とでアルファベットのCの形をつくり乳房を支えて母乳が満ちた状態にすることで，乳房を児の口の中で支えることができる．児のお尻をしっかり引き寄せ，頭部をしっかり支え，下あごを乳房に埋もれるほど近づけておく（この方法は，口蓋裂がない児の授乳にも役立つ）．

手伝ってくれる人をできるだけたくさん見つけておき，食事の用意，掃除・洗濯，上の子どもの世話などを頼むこと，搾乳する場合は，思い切って高品質のダブルポンプの搾乳器を選ぶこと，口唇・口蓋裂を持つ児を母乳で育てているほかの母親と話をするなどの情報提供が有用である．

母親には，乳房から飲む量がわずかであっても，直接授乳することは，児にとって大切であることを伝える．

補足の方法として，口蓋裂用の哺乳瓶だけではなく，他にカップ，シリンジ，フィンガーフィーダーなどがある．詳細は文献を参照されたい．

■参考文献

1）大山牧子．“口唇口蓋裂児を持つ児の母乳育児”．胎児診断から始まる口唇口蓋裂：集学的治療のアプローチ．小林眞司編．東京，メジカルビュー社，2010，82-95.

NICU 最前線

神奈川県立こども医療センター新生児科医長，国際認定ラクテーション・コンサルタント

大山牧子
おおやま・まきこ

8 呼吸障害がある赤ちゃんでも，直接授乳は進められる？

ケース紹介

Hちゃんは妊娠24週で出生した超体出生体重児で，現在修正37週，体重は1,900gになった．新生児慢性肺疾患のため経鼻酸素を0.25L/分投与されている．現在の哺乳量は40mL×8回／日で，刺激を要するような無呼吸発作がなくなったため1週間前から乳房からの哺乳の練習を始めているが，まだほとんど飲み取れていない．お母さんの1子さんは，第1子を2歳まで母乳で育てており，今回も1日当たり600mLくらいの搾乳を維持している．

ここを★チェック

- □ 母乳分泌量は500mL/日以上か？
- □ 無呼吸発作があるときは，いつから授乳できるか？
- □ 酸素投与で呼吸は安定しているか？
- □ 哺乳することが呼吸苦にならないような支援か？

必要とされる母乳分泌量

直接授乳で飲む量が増えない原因を考える際のファーストステップは，母乳分泌が良好かどうかである．特に哺乳力が弱かったり，呼吸が苦しくて十分に吸い付いていられない児にとって，乳汁の流れが良いことは，ストレスなく楽に飲むために最も有用である．母乳分泌が良好であるという目安は，児が1回に哺乳する予定量よりも1回当たりの搾乳量が10～20mL以上多いことであるが，1日量として500mL以上の母乳分泌があることが一つの目安となる[1]．母乳分泌量が500mL/日未満の母親には，直接授乳を継続することが分泌刺激になることを伝える．

呼吸管理中の直接授乳

1．直接授乳実施の基準

無呼吸が遷延している場合，その施設として集中治療下にある児に対する一時的なカンガルーケア[2]をどのような規準で行っているかが，直接授乳を開始する規準になるかもしれない．カンガルーケア中に，徐脈発作が起こったり刺激を要するような無呼吸がなければ，たとえ経鼻陽圧呼吸管理中でも，直接授乳を開始できる．母乳分泌が良好で射乳反射が強い場合は，ある程度搾乳してからカンガルーケアを始める．児の欲しそうな様子に合わせ，気道を確保しながら，児の動きに合わせて，乳房を探索する様子，乳房をとらえて吸着するなどのわずかな動きをとらえる．この時期の観察は，早産児における母乳育児行動スケール（PIBBS 2011）が役立つ（表）．

経鼻酸素カニューレから酸素投与されている場合でも，多呼吸や陥没呼吸の程度が軽く酸素飽和度が95%以上ならば，直接授乳を始めてみる．この場合も，カンガルーケア中から乳房を探索させるようにし，児主導で行うことが望ましい．

2．こんなとき，どうする？

1．哺乳時に酸素飽和度が低下する場合

哺乳時に酸素飽和度が低下する場合は，吸入酸素量を哺乳時に増やすことも考慮する．児によっては，多呼吸があっても哺乳することで満足感が得られ，泣くことが少なくなり，安静を保てることがある．

哺乳瓶からの哺乳と異なり，乳房からの哺乳は，乳汁移行量を児自身が決めるので，哺乳瓶からの哺乳に比べ移行量が少なく，無呼吸や徐脈発作を起こしにくいことが分かっている[3]．

2．むせる心配がある場合

母乳分泌が良好で，児が吸着しただけで射乳反射が起こり，むせる心配がある場合は，児の喉が乳房よりも上になるような授乳姿勢をとる（図）．交差抱き，横抱き，脇抱きいずれの抱き方でも吸着した後，母親が上体を傾けて児の喉の位置を高くすることができる．または，はじ

表　低出生体重児における乳房からの哺乳行動スケール（PIBBS）　覚醒状態・抱き方・姿勢チェック表

	観察年月日		／	／	／	／	／
	観察者名						
	当てはまる赤ちゃんの覚醒状態を番号で						
覚醒状態	1：睡眠　2：うとうと　3：覚醒　4：啼泣						
			当てはまる項目に✓を				
探　索	探索しない	0					
	少し（口を開ける，舌を出す，手を口に持ってくる）	1					
	しっかりした探索（頭を向けると同時に開口する）	2					
乳輪把握	なし，口が乳頭に触れることもある	0					
	乳頭の一部を含む	1					
	乳頭全体を含む，乳輪は含まず	2					
	乳頭と乳輪の一部を含む	3					
吸着と吸着の持続	全く吸着しない，ごくわずか	0					
	5分以内の吸着	1					
	6～10分の吸着	2					
	11～15分以上の吸着	3					
吸　啜	吸啜しない	0					
	なめたり，味わったりするが吸啜しない	1					
	1回だけ，まれに短い吸啜持続（2～9回）	2					
	短い吸啜を繰り返す，時に長い吸啜持続（10回以上）	3					
	2回以上の長い吸啜持続	4					
最大吸啜持続	1～5回	1					
	6～10回	2					
	11～15回	3					
	16～20回	4					
	21～25回	5					
	26回以上	6					
嚥　下	嚥下が見られない	0					
	時々嚥下する	1					
	繰り返し嚥下する	2					
合計点／20点							
	抱き方・姿勢：はじめから適切◎，支援で適切○，次回も要支援△						
抱き方／姿勢	母子ともに心地よい授乳姿勢をとっている						
	児はお尻が引き寄せられており，母親の乳房の高さで抱かれている（母親により導かれる吸着）						
	児はお尻が支えられており，母親の乳房の間に抱かれている（児により導かれる吸着）						
	児の胸とお腹が母親の胸に密着している						
	児の下あごが乳房に付き，鼻と乳頭とが向かい合う						
測定した哺乳量	測定しなかった場合は斜線を						
搾乳量	1日当たり（mL）						
	1回当たり（mL）						
	1日当たり　　回						
その他気付いたこと							

乳汁移行が見られないときの考え方：①搾乳量は十分か，②児の覚醒状態は適切か，③抱き方／姿勢は適切か，④児の下あごの先が乳房に密着しているか，⑤吸啜のリズムが速いからゆっくりになり，同時に嚥下が見られるか．

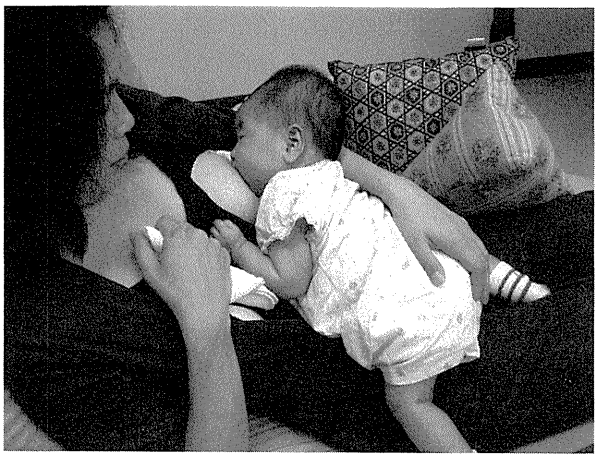

図　むせる心配がある場合の授乳姿勢

めからカンガルーケアの姿勢をとり，児が自由に哺乳できるようにすると，自然に喉が乳房より上になる．このような喉と乳房との位置関係にすると，児の嚥下が乳汁の流れに追いつけなくても，口の脇から乳汁が漏れるのでむせにくい．

3．直接授乳が困難だと判断された場合

さまざまな工夫を行っても，酸素飽和度が85％以下になったり，徐脈を来したり，多呼吸が悪化したりする場合は，授乳中に注意深く観察し，ストレスサインが出る前に授乳を中断し，一休みしてまた再開する．呼吸障害のある児は，哺乳瓶からの哺乳と異なり，呼吸苦があると自分で休息することが多い．

上記のような工夫を行っても，呼吸障害のため授乳することが困難な児には無理に授乳しない．搾母乳を注入しながら，カンガルー抱っこをすることも母乳育児と考えることができる．

■参考文献

1）大山牧子．“お母さんの退院から直接授乳開始のころまでの支援”．NICUスタッフのための母乳育児支援ハンドブック．第2版．大阪，メディカ出版，2010，84-92.
2）カンガルーケア・ガイドラインワーキンググループ編．“トピック2：集中治療下にある児への一時的な「カンガルーケア」”．根拠と総意に基づくカンガルーケア・ガイドライン：普及版．2010，22.
http://minds.jcqhc.or.jp/stc/0068/0068_ContentsTop.html［2011.9.13］
3）大山牧子．“直接授乳のための準備”．前掲書1．93-101.