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Adolescent Hypertension Induced By Obesity and the Efficacy of Comprehensive Intervention

Jinhua Zhao[1], Fei Hong[1], Shengli Lu[1], Feng Zhou[2] and Ming Xu[1]*

[1]*Pediatric Department, the First People's Hospital of Nantong, Nantong, Jiangsu 226001, China*
[2]*Laboratory Department, the First People's Hospital of Nantong, Nantong, Jiangsu 226001, China*

Abstract

Background and Objective: With the development of economy, people's quality of life has been improved, obesity caused by over-nutrition has increased among teenagers, and the age of patients with obesity induced hypertension has been younger and younger.

Methods: In order to effectively prevent and treat adolescent hypertension, this study collected the data of age, height, weight, demographic characteristic, waist circumference, hip circumference, knowledge of hypertension and blood pressure of 1000 students at Grade 7 ~ 9 in XX middle school through questionnaire and physical examination, and the relationships between the above factors were analyzed. Students with obesity induced hypertension were given comprehensive intervention. Blood pressure, blood lipid, blood glucose and body mass index were detected before and after treatment.

Results: Obesity index of students with hypertension were significantly higher than those of normal students. Age, waist circumference and body mass index significantly affected the risk of hypertension. After comprehensive intervention, the blood pressure, blood lipid, body mass index and glycosylated albumin of students with hypertension decreased, glucagon increased, and no significant changes were found in other blood glucose indexes.

Conclusion: Obesity increases the risk of hypertension, and comprehensive inter

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ion, provided the original author and
ac i ie e igni can l
a cia ed i h be i Obe i a a edic i e fac f h e en ion
ha an im ed acc ac am ng hi e Hi anic hi e ad le cen
and ha a dec ea ed acc ac am ng Af ican Ame ican ad le cen .
In hi d e c m ehen i el anal ed he ela ion hi be een
age, heigh , eigh , ai ci c mfe ence, dem g a hic cha ac e i ic,
hi ci c mfe ence, kn ledge f h e en ion and bl d e e in
1,000 den ing ade 7-9 f XX Middle Sch l h gh e ionnai e
e and h ical e amina ion. en, he be e and h e en i e

e a h ene i of h e en ion i com le . Abno mal mma he ic ne o em, a c la f nc ion and fa ma be he ca e of h e en ion, b in mo ca e , he e a e man ea en o king ge he . e ingle ca e of h e en ion i a e. e e ec of mma he ic ne o em en h e en ion i ho n in Fig e 1.

Fi l abno mal change of cen al ne o em in he ce eb al co e ed ce ong ignal , hich lead o abno mal ec e ion of i e hich ec e e abno mal ne o an mi e , incl ding ad enaline and d amine leading o he enhance of he ac i i of mma he ic ne o em, hich in n inc ea e he concen a ion of ca echolamine in blood and enhance he con ac ion of e i ance a e ie le .

e e ec of a c la d f nc ion on h e en ion a ela ed o enin-angio en in-ald o e one em (RAAS) [9]. When RAAS a ac i a ed fo ome ea en , he ac i i of enin and ald o e one o ld inc ea e d ama icall h o ome ing he od c ion of angio en in in he ele an i e . Angio en in co ld o ome e he con ac ion of mall a e ie and l ima el inc ea e blood e e.

e e ec of abno mal fa on h e en ion a ela ed o adi okine , ch a le in and adi onec in [10]. Le in a a ol e ide ha co ld ac i a e he mma he ic ne o em hen en e ing blood o inc ea e blood e e. Ho e e , he e ec of le in on blood e e a ela ed o o la ion cha ac e i ic , ch a ace o bod e. Adi onec in a gl co e me abo li m. Mo eo e , i co ld im o e NO le el b elimina ing endo helial cell d f nc ion, hich migh be ed fo inhibi ing he ac i i of mma he ic ne o em o achie e an ih e en i e e ec .

Methods

Analysis of object

e 1000 den aged 7 o 9 in Nan ong middle ch ol e e in e iga ed f om Se embe 2019 o Ma ch 2020 in Fi Pe le' Ho i al of Nan ong. e e e e 525 female and 475 male, i h an a e age age of (15.7 0.12) ea old. 1000 den e e and oml elec ed fo emi ical anal i . No famil hi o a e o ed, and no e io illne occ ed in he a ea . A e he e alence of be i and a cia ed me abolic abno mali ie . i g o com le ed an h o me ic, blood e e and clinical e amina ion , fa ing en o blood e ing, and anda d e ionnai e o fo m he ba eline o la ion fo he follo - co ho fo hi d Pa ici a e in a ni ed medical e amina ion a e he in e iga o , and hei a en o g a dian ha e igned info med con en .

Obesity and hypertension state

Heigh and eigh mea emen : e bjec ok o hei ho e and co a and od on a heigh and eigh cale in a anda d igh o i ion. e bod a na all aigh d ing he e . e e ead he heigh and eigh ic l acco ding o he anda d . e heigh a in cen ime e (cm) and he eigh a in kilog am (kg). Beca e di e en e le had di e en heigh , i a inacc a e j dge be i b eigh alone. e efo e, i a nece a o connec heigh i h eigh , i.e. bod ma inde (BMI), o mea e he he a e en a obe e. e me ic fo m la a a follo [11]:

BMI = (Weigh in Kilog am / (Heigh in Me e) Heigh in Me e))

Acco ding o he anda d fo g o h and de el men of child en elea ed b WTO, BMI 25 kg/m² a e al a ed a o e eigh and BMI 30 kg/m² a e al a ed a obe e.

Wai ci c mfe ence and hi ci c mfe ence mea emen : e ai and hi ci c mfe ence of he bjec e e mea ed ing an ela ic a e. When mea ing ai ci c mfe ence, he ela ic a a enci cled one o nd abo e he na el. On he emi e of no c ing in o he kin, he a e a cl e o he kin a e ible, and he eading a acc a e o one digi bef e he decimal oin . When mea ing hi ci c mfe ence, he a e a enci cled one o nd a o nd he ide a of he hi . e bjec e e in an igh o i ion, and he eading a acc a e o one digi a e he decimal oin [12].

Blood pressure test: e bjec a ie l e a e ial blood e e of he igh e a m a mea ed b he calib a ed me c h gmomanome e . e igh e a m a' ke a he ame le el a he hea , and he e a m a igh l a ed i h he c . e in e al of h ee mea emen a 1 min e. e e o be een eading a le han 4 mm Hg, and he a e age a aken a he nal e l . H e en ion a a ec ed b e age and heigh . Acco ding o he c i e ia bli hed b he Ame ican H e en ion Ed ca ion P oje Yo h W o king G o , h e en ion a de e mined hen he mean ol ic blood e e (SBP) o (and) mean dia olic blood e e (DBP) a g ea e han o e al o P95.

Unde he emi e of en ing a balanced die , ● limi odi m in ake and ● ibi e ce, i e ea ing. M● e● e , he a ien e e a ked ● e e ci e ea nabl acc● ding ● hei h ical condi ion . e g a dian hel he a ien ● c● ec bad habi and main ain a ea nable e . Rea nable eigh con ol lan e e fo m la ed acc● ding ● he ac al i a ion of di e en a ien .

Statistical Analysis

Rele an da a e e anal ed ing SPSS 20.0 ● a e. e c● n e l e e e ed a . e den - e a e fo med ● anal e he di e ence be een ● g ● and ●ne- a ANOVA a lied ● com a e he di e ence be een m l ple g ● . Each a a a ea ed a lea h ee ime and he a e age a a i icall anal ed. M l i ia e eg e ion anal i a ili ed ● indica e he ela ion hi be een ●be i and h e en ion ela ed fac ● .

Result

Analysis of obesity and hypertension state

A h● n in Table 1, he a e age eigh of he h e en ion g ● and n● mal g ● a (63.49 13.22) kg and (2.59 10.21) kg e ec i el i h (P = 0.001), hich h● a a i icall igni can di e ence. e ai ci c mfe ence of he h e en ion g ● and n● mal g ● a (75.44 10.92) cm and (68.73 8.15) cm e ec i el i h (P < 0.05), hich h● a a i icall igni can di e ence. e hi ci c mfe ence of he h e en ion g ● and n● mal g ● a (92.10 7.98) cm and (85.95 7.91) cm e ec i el i h (P < 0.05), hich h● a a i icall igni can di e ence. e BMI of he h e en ion g ● and n● mal g ● a (22.12 4.02) kg/m2 and (19.58 3.34) kg/m2 e ec i el i h (P < 0.05), hich h● a a i icall igni can di e ence. e ai -hi a io of he h e en ion g ● and n● mal g ● a (0.83 0.08) and (0.81 0.07) e ec i el i h (P < 0.05), hich h● a a i icall igni can di e ence. e ai - ●-heigh a io of he h e en ion g ● and n● mal g ● a (0.46 0.07) and (0.44 0.06), i h (P < 0.05), hich h● a a i icall igni can di e ence. I a fo nd ha he ●be i indica ● of he h e en ion g ● e e la ge han h● e of he n● mal g ● , and he di e ence e e a i icall igni can .

A h● n in Table 2, m l i a ia e eg e ion anal i h● ed ha ●nl age, hi ci c mfe ence and BMI e e igni can l c● ela ed i h h e en ion. e eg e ion coe cien of age, hi ci c mfe ence and BMI e e 0.182, 0.062 and 0.096 e ec i el all of hich e e ● i i el c● ela ed i h h e en ion. I indica ed ha he g ea e he age, hi ci c mfe ence and BMI, he m● e likel i a ● e f●m h e en ion.

e ect of comprehensive intervention treatment

A h● n in Table 3, he a e age ● lic e e, a e age dia lic e e, BMI, bod fa , nk fa , abdominal fa , e le limb fa and l● e limb fa of he a ien i h h e en ion bef● e and a e com ehen i e ea men e e di e en in di e en a of he a ien .

A h● n in Table 4, igl ce ide , ● al ch●le e ●l and gl ca ed alb min in he ●be e ad●le cen i h h e en ion e e igni can l dec ea ed a e i mon h of com ehen i e in e en ion com a ed i h h● e bef● e ea men (all P < 0.01); gl cag●n a igni can l inc ea ed (P < 0.05); h● e e , he e e e igni can change in bl●●d gl c● e, gl ca ed hem●gl●bin and in lin e i ance inde a e ea men (P < 0.05).

Discussion

Man die ha e h● n ha he i k ●f h e en ion in ad●le cen i ● ●● ional ● he deg ee of ●be i and ●be i can al ● inc ea e he incidence of h e en ion in ad l [12, 13]. e da a of he bjec in hi d h● ed ha all ●be i indica ● in he h e en ion g ● e e highe han h● e in he n● mal g ● , indica ing ha he inc ea e of fa and abn● mal di ib ion c● ld inc ea e he i k ● f h e en ion. e abn● mal inc ea e and di ib ion of adi ● e i e in he bod im ● ed he demand f● bl●●d ● , and he a e ial bl●●d e e inc ea ed ● achie e ch a high-ci c la ion em [14]. On he ● he hand, he con en of adi ec e fac ● ch a le in in ●be e e le inc ea ed he e ci abili of m a he ic ne ● , em, e l ing in inc ea ed bl●●d e e. M l i a ia e anal i of fac ● in encing h e en ion h● ed ha ●lde e le e m● e

he inc ea ed d e and h i•l•gical change b • gh b he inc ea e •f age. Ad•le cen h• a' e a he age •f a id g •. h'ha e inc ea ed bl••d •. , and he bl••d e i ine i abl inc ea ed.

e a h•gene i •f h e en ion i com le , and i i in enced b man fac • . P e i• e idence ha h• n ha , in addi i•n • •be i and h e li idemia, dail habi , ch a lee ali die and lack •f e e ci' e a e al • fac • a ec ing he incidence •f h e en i•n [15]. In hi d e e i ed he e ec i ene •f com ehen i e in e en ion mea e b com a ing bl••d e e, bl••d li id and bl••d gl c• e bef• e' and a e com ehen i e in e en ion. e e l h• ed ha he b•d ma inde and gl c• a ed alb min •f den i h h e en ion' dec ea ed, and gl cag•n inc ea ed a e com ehen i e in e en ion. T igl ce ide and • al ch•le e •l a e bl••d li id . Bl••d li id a e ec e'ed b adi •c e in he b•d and en e he la ma. e e li id can ac i' a e he m a he ic ne • , em and • m• e he • d c ion •f ca ech•lamine [16]. Ele a ed la ma c•ncen a ion can eng hen he c•n ac ion •f a e i•le and inc ea e bl••d e e. In he e en d e f• nd ha he • kind •f bl••d li id igni can l dec ea ed and he bl••d e e dec ea ed a e com ehen i e in'e en ion, gge ing ha he e a n• need • inhibi com a ion. Gl ca ed alb min a al • igni can l dec ea ed. Gl cag•n ha been e • ed • • m• e he dec m• i•n •f gl c•gen and ai e bl••d gl c• e le el. A e l• , •f e e ci e, he c•ncen a ion •f gl cag•n • ld i e. In hi d b• hTJ0.149 T .5(dail)0.5(habi ,)0.5(D7a ech•land bl••d gl c• e bef• ,)0.5(.5(i e.5(a ed ab c